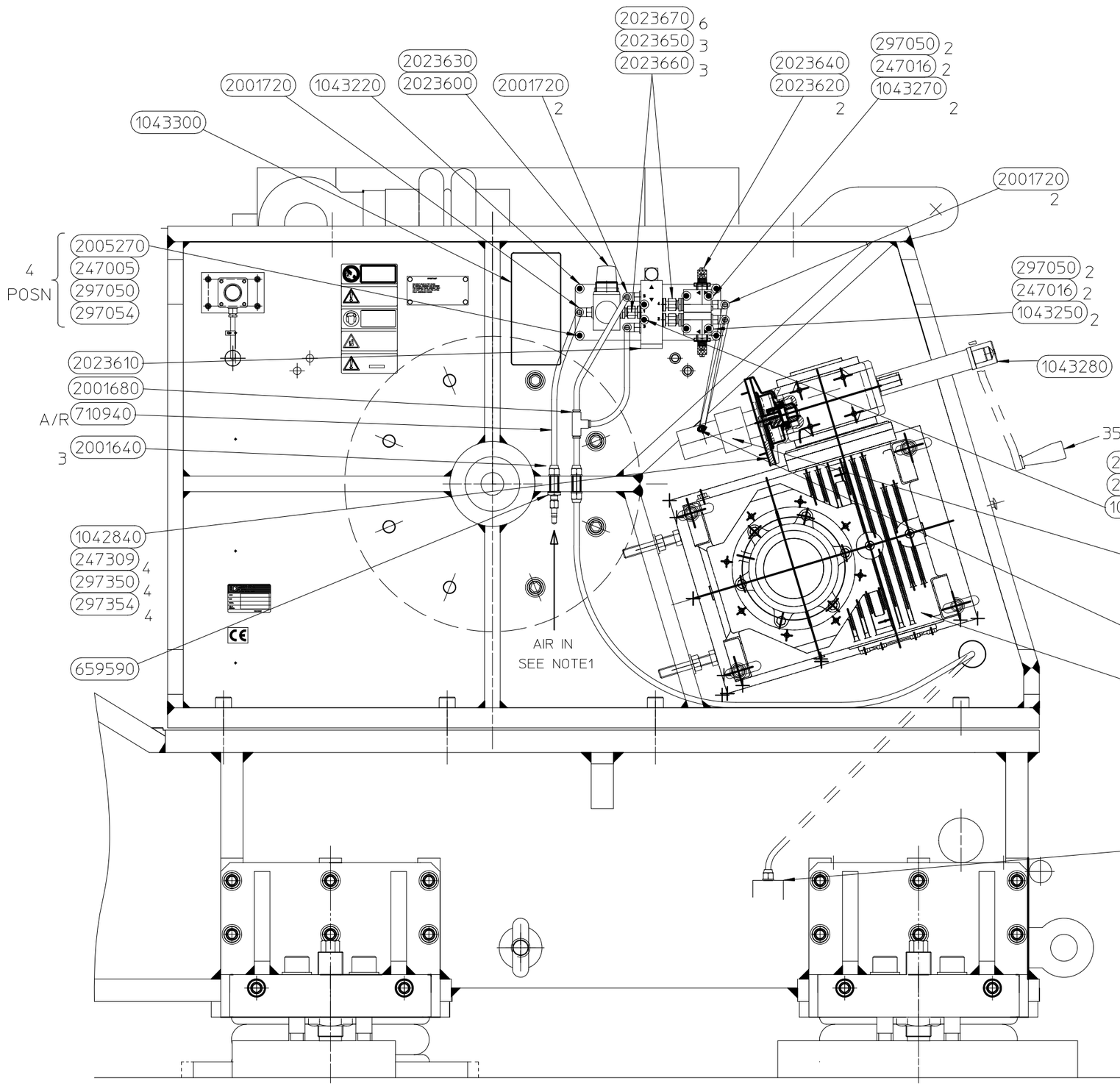
DRG No. 4042710

ISSUE	
A	25/07/11
2	19/08/11 DRG INTRODUCED



NOTES:-

1. IF HAND CRANK TURN OVER FUNCTION IS REQUIRED (MAINTENANCE OR WHEN AIR SUPPLY IS NOT AVAILABLE) THEN SHAFT COVER 1043280 SHOULD BE REMOVED AND CRANK ASSEMBLEDTO SHAFT.
   WARNING- CRANK SHOULD ALWAYS BE REMOVED AND COVER 1043280 REPLACED BEFORE OPERATING AIR POWERED TURN OVER.
2. THE AIR SUPPLY FOR POWERED TURN-OVER IS OBTAINED BY UNCOUPLING THAT TO THE VIBRATOR ISOLATION SYSTEM AND COUPLING UP TO THE MALE COUPLING 659590 SHOWN, THIS IS TO PREVENT BOTH BEING OPERATED SIMULTANEOUSLY.
   THE SPRING CENTRED LEVER ON 2023610 PROVIDES CONTROL OF ROTATION AND IF RELEASED WILL RETURN TO THE OFF POSITION.
3. DURING INITIAL FACTORY SET-UP THE MAX PRESSURE LIMITER KIT 2023630 IS TO BE FITTED INTO THE REGULATOR 2023600 AND SET TO THE MINIMUM PRESSURE REQUIRED TO RAISE THE VIBRATOR FROM HORIZONTAL TO VERTICAL.
4. AFTER PRESSURE SET UP THE RAISE AND LOWER SPEEDS MAY BE SET INDIVIDUALLY USING THE FLOW CONTROL VALVES 2023640, AS A GUIDE THE 1/4 TURN SHOULD BE SET FOR A 1-5min DURATION.

WARNING- CRANK SHOULD ALWAYS BE REMOVED AND COVER 1043280 REPLACED BEFORE OPERATING AIR POWERED TURN OVER.

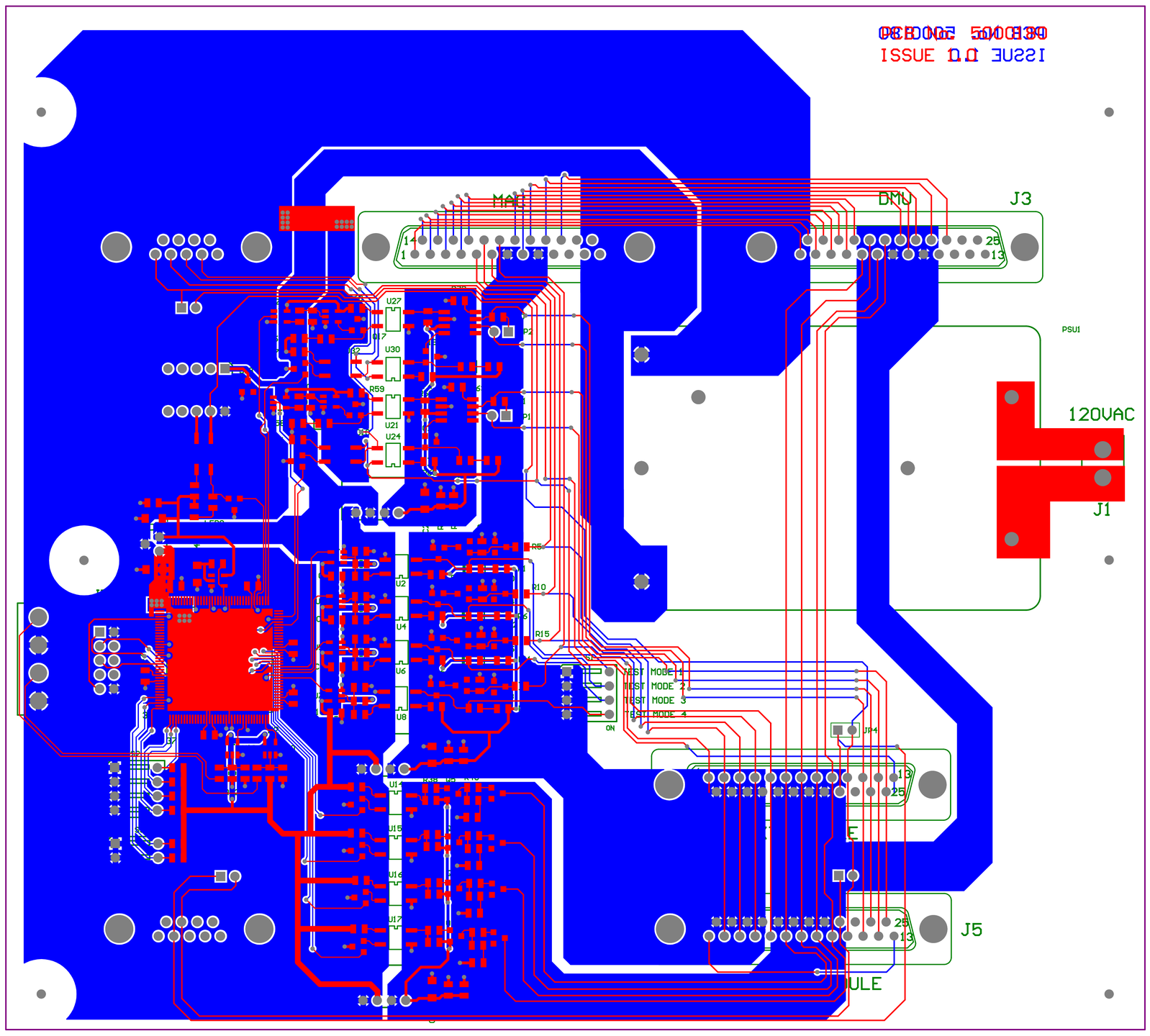
USED ON	
DATE 25/07/11	
FOR EXPLANATION OF DIMENSIONS & NOTES ETC SEE BS 308	
ALL DIMENSIONS IN MILLIMETRES	
Machine where marked ∇ Surface texture values in µm Threads are Isometric Coarse Series Tolerance Class 6g/6H to BS 3643	Tolerances unless otherwise Stated ±1 Where one decimal place is shown i.e. 15 = ±0.5 Where two decimal places are shown i.e. 150 = ±0.25 Tolerance on drilled holes ±1% OR ±0.05 whichever is greater Angular tolerance ±1°
MATERIAL:	FINISH:
TITLE: AIR POWERED TURNOVER KIT,V994	
DRAWN: TP / CHECKED: RR / SCALE: 1 : 1 / DRG. No. 4042710	A1
SHT 1 OF 1 SHTS	

THIRD ANGLE PROJECTION

REMOVE ALL BURRS & SHARP EDGES.
MARK PART NUMBER AND ISSUE NUMBER WHERE SHOWN THUS ⊠ DO NOT SCALE

0 100 mm

P_BLANKA1



Manufacture Notes

1. Manufacture in accordance with BS9761
2. MATERIAL
   1.60mm thick Double Sided FR4
   Outer layers to be 1oz copper

3. FINISH
   Through hole plating to BS6221
   Hot air solder level
   Green photoimageable Solder Resist
   White Silkscreen

LDS TEST AND MEASUREMENT LTD			
ENGINEER: GS Designs PHONE: 01438 813332	TITLE: Interlock Supervisor		
ENGINEER: PHONE:	PART NO.: PCB No. 5000180	REV: 1.0	DATE: 03/10/2006
FILE NAME: INTERLOCK_SUPERVISORV10.PCBDOC	LAYER: Bottom Layer	GERBER: .GBO	

Chapter 4 Armature position control APC

4.1 Control system

The APC system extends the standard PIC2 system described in Manual 787801 to ensure that armature mid-position is maintained under all conditions, thus preventing undue stresses on the equipment and payload.

Body positioning for the V9 vibrator is fixed due to the solid trunnion mounting detailed in Chapter 3; dynamic armature control is provided by the standard V9 centre positioning system (CPS).

The standard load support system is replaced by the APC system, which combines PIC2 armature control with control of the load-bearing platform described in **Error! Reference source not found.**. For horizontal operation with the slip table the APC applies either air pressure or vacuum to the armature chamber.

A PLC controls the armature position as described below. The PLC and its associated components are located in the special pneumatics and servo box described later in this chapter.

Note: Each V9 vibrator responds uniquely to load support adjustment, depending on the rate of air leakage past the armature bearing. In multiple vibrator systems a flow control valve in the pneumatics and servo box can be adjusted so that all vibrators respond identically to APC control.

Position indication

Though the V9 vibrator has a 76 mm working stroke the PIC2 and PIC2RS and displays only the central 50 mm movement.

4.2 Armature control

When the system is powered up and before the amplifier is switched on, the PLC repeats the armature PIC2 lower/raise signals to the armature control valve so that load support pressure is adjusted as described in Manual 787801.

When the amplifier is switched on, the PLC records the current load support pressure (proportional to the payload mass) as a set-point value and thereafter sends lower/raise signals to the armature control valve to maintain this value. Dynamic armature control is provided by the CPS once amplifier modules are enabled.

Note: If the system is not controlled by a MAC, while the amplifier is switched on with modules not enabled, there is no armature position control and armature position may drift.

4.3 PLC inputs and controls

The PLC logic depends on the following inputs in addition to the armature PIC2 lower/raise signals:

V830-185 Shaker

Configuration and System Performance

V830-185 imperial SHAKER

Performance Parameters

Armature diameter	7.28 in
Sine force peak (stabilised)	2000 lbf
Random force rms	1300 lbf
Half sine peak bump force[3]	3900 lbf
Armature resonance (f_n)	3100 Hz
Useful frequency range	DC - 3500 Hz
Mass of moving element[5]	15.39 lb
Velocity sine peak - full field	78.7 in/s
Acceleration sine peak[5]	120 g_n
Acceleration random rms[5]	75 g_n
Displacement (cont.) pk-pk	2.0 in
LDS amplifier	SPA8-16K

Characteristics

Suspension axial stiffness	zero
Suspension cross-axial stiffness	30000 lbf/in
Suspension rotational stiffness	600000 lbf/in
Lin-E-Air body resonance	< 5 Hz
Shaker body mass	1358 lb
Internal load support capability	353 lb
Stray magnetic field[1]	< 5 gauss
Cooling air flow Shaker	520 ft³/min
Cooling air flow Amplifier	1165 ft³/min
Compressed air supply required	100 psi
Total electrical requirements Amplifier, FPS and blower	28.1 kVA

Enviromental Data

Working ambient temperature range

Shaker	32° to 86 °F
Amplifier	34° to 86 °F

Acoustic noise at 1 metre distance[2]

Shaker[4]	110 dBA
Amplifier	69 dBA
Blower	88 dBA

Total heat dissipation

Shaker - radiated from body	1.0 kW
Amplifier	1.46 kW
Blower	9.8 kW

1 Measured at 6 inch above armature table, full field
2 Measured at a distance of 39 inch and 63 inch above floor level in enclosed cell
3 Due to the complex nature of shock pulses, LDS has sophisticated software to evaluate the performance. Please contact your local representative.
4 Max. noise when running at full level bare table performance
5 Ratings given with flush inserts

V830-185 Shaker Options

Alternative armature size	❍
Armature Insert Selection M8	●
3/8"UNC/UNF	❍

Mounting Selection

Trunnion mounted solid	●
Lin-E-Air body isolation & guidance system	❍
Trunnion mounted with airglide mobility	❍
Trunnion mounted with V-groove casters	❍
Combination shaker/slip-table base	❍
Air isolation mounts - floor level	❍
Rubber isolation mounts - floor level	❍
Low gauss kit	❑
Silencer, shaker cooling fan -3 dBA reduction	❍
Acoustic enclosure -8 dBA	❍
Chamber floor support option	❍
Thermal barrier	❍

Key
● Standard - available on shortest delivery
❍ Option - stocked item available on short delivery
❑ Special option - non-stocked item

System Performance	V830-185 SPA8K	V830-185 SPA16K
Sine Force (pk)	1524 lbf	2000 lbf
Max Acceleration Sine (pk)	99 g_n	120 g_n
Random Force (rms)	1298 lbf	1300 lbf
Max Acceleration Random (rms)	75 g_n	75 g_n
Velocity (pk) - full field	78.7 in/s	78.7 in/s

The *V830* can be fitted with an optional Lin-e-air isolation trunnion preventing the posibility of structural damage to buildings. This unwanted movement can become more pronounced during low frequency testing where there is a high turning moment, or when payloads are offset - not uniform in shape.

Contents

Preface to this Electronic Edition

Alan Blackwell and Kerry Rodden
University of Cambridge Computer Laboratory

Ivan Sutherland's Sketchpad is one of the most influential computer programs ever written by an individual, as recognized in his citation for the Turing award in 1988. The Sketchpad program itself had limited distribution — executable versions were limited to a customized machine at the MIT Lincoln Laboratory — so its influence has been via the ideas that it introduced rather than in its execution. Sutherland's dissertation describing Sketchpad was a critical channel by which those ideas were propagated, along with a movie of the program in use, and a widely-cited conference publication [10]. Copies of the dissertation were distributed relatively widely, but it was never published commercially. It is still available in the form of a technical report from MIT, but we believe it deserves wider readership — hence this electronic archival publication.

After 40 years, ideas introduced in Sketchpad still influence how every computer user thinks about computing. It made fundamental contributions in the area of human–computer interaction, being one of the first graphical user interfaces. It exploited the light-pen, predecessor of the mouse, allowing the user to point at and interact with objects displayed on the screen. This anticipated many of the interaction conventions of direct manipulation, including clicking a button to select a visible object, and dragging to modify it. Smith's Pygmalion [9], heavily influenced by Sketchpad, made a more explicit argument for the cognitive benefits of this kind of direct interaction and feedback, coining the term "icon", and making it clear that graphical images could represent abstract entities of a programming language. Smith was a member of the team that developed the Xerox Star workstation on these principles; in a retrospective article [4] they acknowledge that "Sketchpad influenced Star's user interface as a whole as well as its graphics applications", providing a direct link to the commercialization of the Macintosh and Windows interfaces and widely recognized benefits of direct manipulation [8].

Sketchpad encountered a critical challenge that remains central to human-computer interaction. Sutherland's original aim was to make computers accessible to new classes of user (artists and draughtsmen among others), while retaining the powers of abstraction that are critical to programmers. In contrast, direct manipulation interfaces have since succeeded by reducing the levels of abstraction exposed to the user. Ongoing research in end-user program-

ADDENDUM 3000390

SPA-K Amplifier Control Software

This addendum to be included with Manuals 097571 etc

SPA-K amplifiers are described in Manual 097571 and other manuals. This addendum describes the installation and operation of PC control software for use with an SPA-K amplifier.

The software provides the following features:

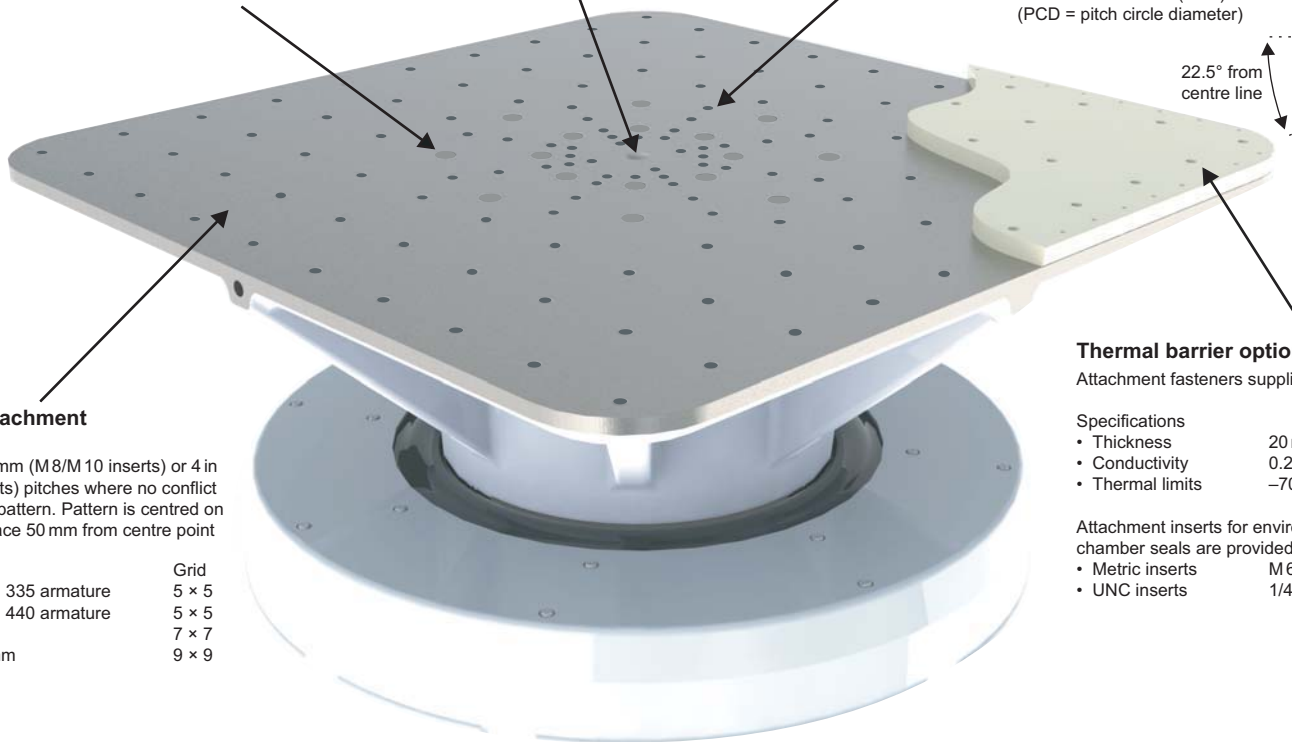
- On/off control
- Monitoring including display of interlocks
- Editing and storage of amplifier settings
- Integration with LDS Laser software
- Also suitable for SPA176K amplifier and SPA-K/SPA176K replacement amplifiers

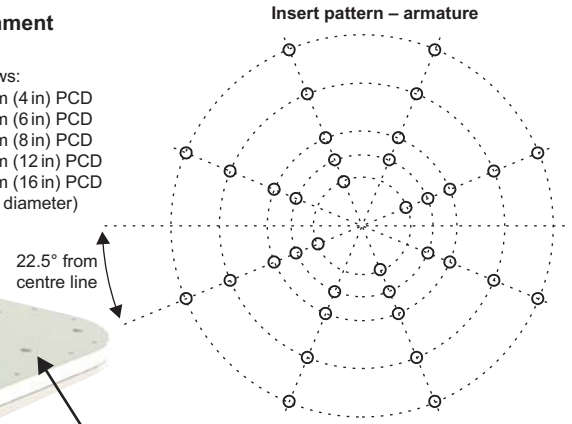
Contents of this addendum

Associated publications **No.**

Manual, SPA-K Series 3 Amplifiers 097571
Manual, SPA-K Series 3 Replacement Amplifiers.....078491
Manual, SPA176K Replacement Amplifier 079401
Manual, V9 Systems.....4001041

Feature Details and Specifications





100111

Head Expander Kit Contents

Each kit comprises:
- Head expander with keyed payload attachment inserts in grid and armature patterns
- Armature screws, dedicated wrench key and torque wrench
- Lifting eyebolt (attachment points top and bottom)
- Manual and product datasheets

Recommended Options

Accelerometers: IEPE accelerometers with TEDS, side connector, insulated base (cable not included):
- Type 4513-B: 10 mV/g, Handles up to 500 g
- Type 4513-B-001: 100 mV/g, Handles up to 50 g

Compatible Cables: Single screen coaxial, 10–32 UNF (M) to BNC (M), max. +70°C (+158°F):
- AO-0531-D-050: 5 m (16.7 ft)
- AO-0531-D-070: 7 m (23.3 ft)
- AO-0531-D-100: 10 m (33.3 ft)

2010-09
BU 3076 – 11

HEADQUARTERS: Brüel & Kjær Sound & Vibration Measurement A/S · DK-2850 Nærum · Denmark
Telephone: +45 7741 2000 · Fax: +45 4580 1405 · www.bksv.com/lds · info@bksv.com

Local representatives and service organisations worldwide

Brüel & Kjær

V830-185 Shaker

Configuration and System Performance

V830-185 imperial SHAKER

Performance Parameters

Armature diameter	7.28 in
Sine force peak (stabilised)	2000 lbf
Random force rms	1300 lbf
Half sine peak bump force[3]	3900 lbf
Armature resonance (f_n)	3100 Hz
Useful frequency range	DC - 3500 Hz
Mass of moving element[5]	15.39 lb
Velocity sine peak - full field	78.7 in/s
Acceleration sine peak[5]	120 g_n
Acceleration random rms[5]	75 g_n
Displacement (cont.) pk-pk	2.0 in
LDS amplifier	SPA8-16K

Characteristics

Suspension axial stiffness	zero
Suspension cross-axial stiffness	30000 lbf/in
Suspension rotational stiffness	600000 lbf/in
Lin-E-Air body resonance	< 5 Hz
Shaker body mass	1358 lb
Internal load support capability	353 lb
Stray magnetic field[1]	< 5 gauss
Cooling air flow Shaker	520 ft³/min
Cooling air flow Amplifier	1165 ft³/min
Compressed air supply required	100 psi
Total electrical requirements Amplifier, FPS and blower	28.1 kVA

Enviromental Data

Working ambient temperature range

Shaker	32° to 86 °F
Amplifier	34° to 86 °F

Acoustic noise at 1 metre distance[2]

Shaker[4]	110 dBA
Amplifier	69 dBA
Blower	88 dBA

Total heat dissipation

Shaker - radiated from body	1.0 kW
Amplifier	1.46 kW
Blower	9.8 kW

1 Measured at 6 inch above armature table, full field
2 Measured at a distance of 39 inch and 63 inch above floor level in enclosed cell
3 Due to the complex nature of shock pulses, LDS has sophisticated software to evaluate the performance. Please contact your local representative.
4 Max. noise when running at full level bare table performance
5 Ratings given with flush inserts

V830-185 Shaker Options

Alternative armature size	❍
Armature Insert Selection M8	●
3/8"UNC/UNF	❍
Mounting Selection	
Trunnion mounted solid	●
Lin-E-Air body isolation & guidance system	❍
Trunnion mounted with airglide mobility	❍
Trunnion mounted with V-groove casters	❍
Combination shaker/slip-table base	❍
Air isolation mounts - floor level	❍
Rubber isolation mounts - floor level	❍
Low gauss kit	❑
Silencer, shaker cooling fan -3 dBA reduction	❍
Acoustic enclosure -8 dBA	❍
Chamber floor support option	❍
Thermal barrier	❍

Key
● Standard - available on shortest delivery
❍ Option - stocked item available on short delivery
❑ Special option - non-stocked item

System Performance	V830-185 SPA8K	V830-185 SPA16K
Sine Force (pk)	1524 lbf	2000 lbf
Max Acceleration Sine (pk)	99 g_n	120 g_n
Random Force (rms)	1298 lbf	1300 lbf
Max Acceleration Random (rms)	75 g_n	75 g_n
Velocity (pk) - full field	78.7 in/s	78.7 in/s

The *V830* can be fitted with an optional Lin-e-air isolation trunnion preventing the posibility of structural damage to buildings. This unwanted movement can become more pronounced during low frequency testing where there is a high turning moment, or when payloads are offset - not uniform in shape.

4.5 PIC2 sensors

The armature PIC2 and CPS sensors are mounted independently on suspension blocks (see Figure 6) and read the appropriate area of a tandem target mounted on the armature. Each sensor is located to match the centre position of its part of the vertical target.

To maintain their positions the sensors should be only removed during maintenance by undoing the attachment screws shown in Figure 6.

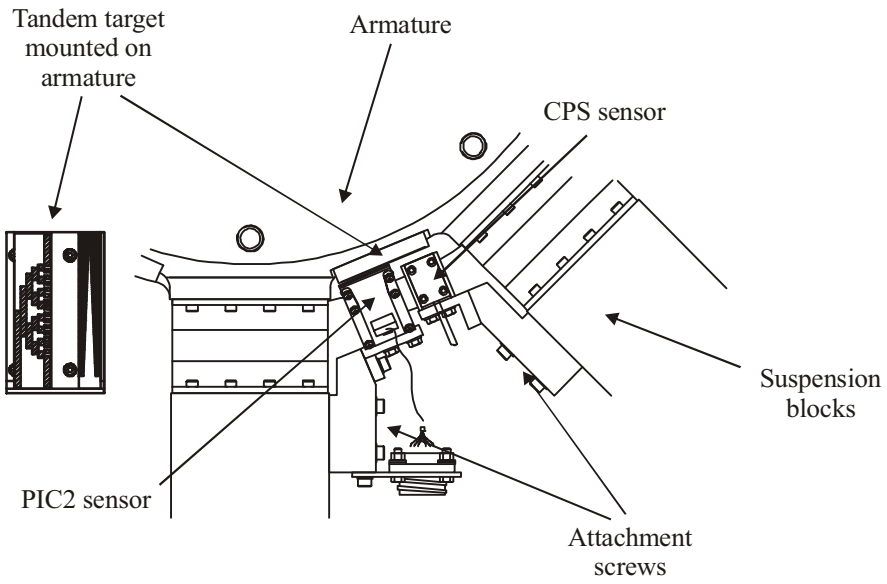


Figure 6 PIC2 and CPS sensors and targets

4.6 PIC2 operation check

Correct function of the PIC2 system can be checked as follows:

1. On the control stand, set the PIC2 panel to Preset and switch on.
2. Relieve any pressure in the the pneumatics and servo box (see Figure 5) by pressing the red button in the base. Open the box.

WARNING

WHILE THE CONTROL STAND IS SWITCHED ON, MAINS ELECTRICITY AND HIGH-PRESSURE AIR ARE PRESENT IN THE ENCLOSURE.

3. Press the ⊕ button on the PLC and check that the armature (and slip plate or LBP table) moves smoothly to the top of its travel.

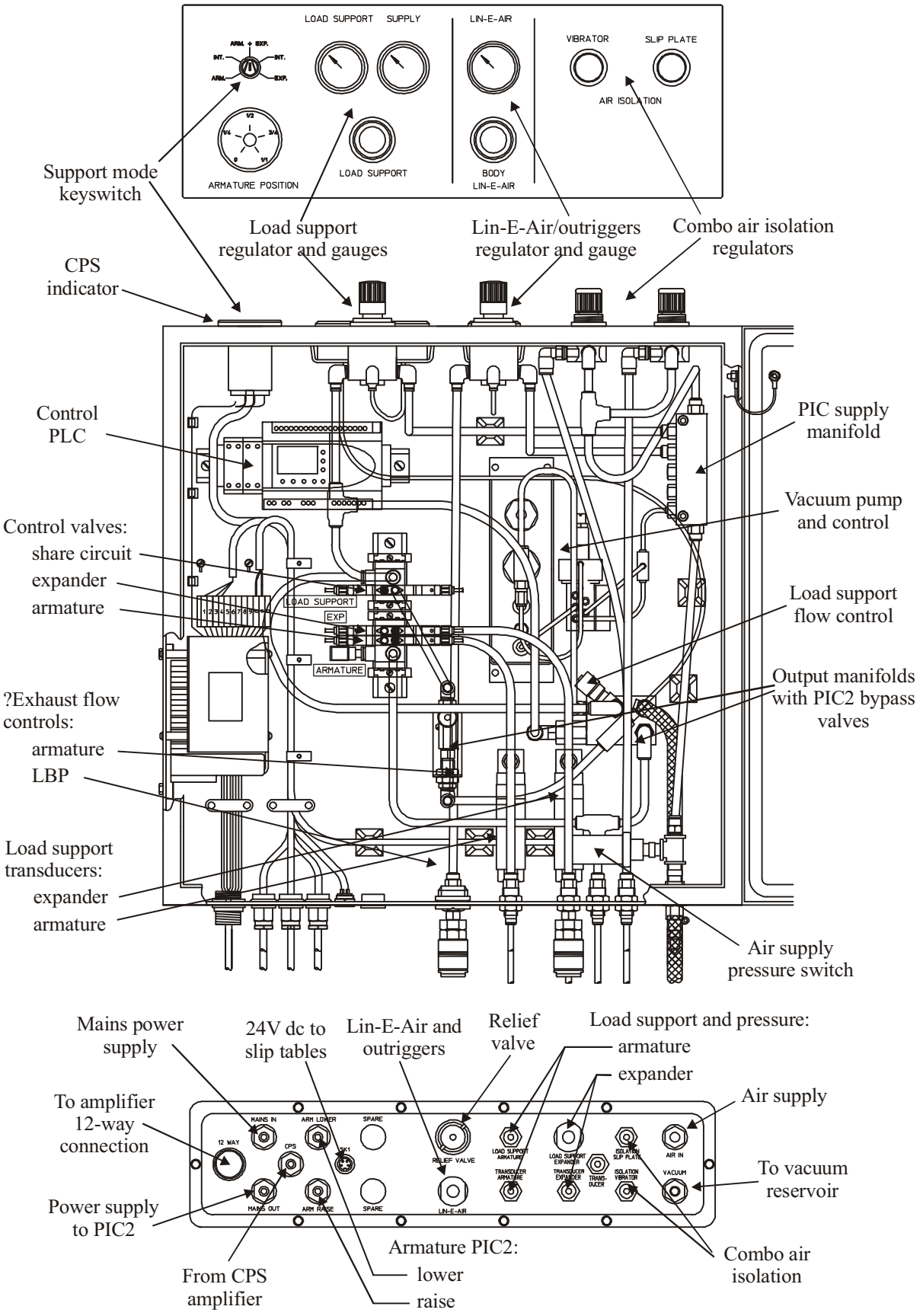


Figure 5 Pneumatics and servo box

SYSTEM DATA

Standard Head Expanders

LDS' standard range of high-quality head expanders increases the capability of existing shaker systems by allowing users to increase the effective mounting surface compared to that of the armature, and thus accommodate larger payloads.

The head expanders have been designed using advanced finite element analysis modelling techniques and are cast from a high-strength magnesium alloy with excellent damping properties.

Each head expander is supplied complete with fasteners and fitting tools for immediate testing capability. Four accelerometer mounting positions are conveniently situated below the payload mounting surface at appropriate control points.

To enable use with environmental chambers, thermal barriers are available for each size in the range. Other insert patterns can be supplied to special order.

Uses

- Increase the effective mounting surface of the shaker armature
- Accommodate larger payloads
- Increase the quantity of test items at one time to speed up test time
- Provide increased flexibility in fixture design

Features

- High-quality aerospace grade magnesium alloy structure with excellent damping properties
- Usable frequency range up to 2 kHz (see note* below)
- Standard insert pattern in M8, M10 or 3/8 UNC insert sizes
- Accurate, in-house tested dynamic performance (first mode data supplied)
- Multiple accelerometer control positions (10 – 32 thread)
- Includes full mounting kit with tools
- Corrosion resistant: Non-machined parts are painted; machined parts are coated with lubricant
- Standard off-the-shelf design for short lead time
- Full technical support
- Accelerometer options (see overleaf: Recommended Options)

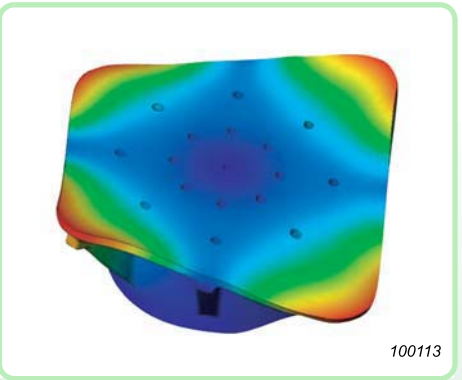
* Head expanders can be used at frequencies up to 2 kHz subject to the control strategy (e.g., multipoint), payload characteristics and test profile. Optimal setup can be higher.

1000 × 1000 head expander mounted on V875LS Lin-E-Air shaker

Standard Head Expander Range

Shakers	Armature Diameter (mm)	Head Expander Size (mm)	Inserts	Kit Part No.	Mass (kg)*	1st Vertical fn (Hz)†	Height (mm)	Optional Thermal Barrier Part No.	Optional Thermal Barrier Mass (kg)*
V830-335	335	610 × 610 mm	M8	4038290	49.4	1580	220	4039470	12.7
			M10	4038300				4039950	
			3/8 UNC	4038310				4039480	
V850-440 V875-440/640 V875LS V8 V9	440	610 × 610 mm	M8	4038260	55.8	2047	220	4039410	12.7
			M10	4038270				4039940	
			3/8 UNC	4038280				4039440	
	440	762 × 762 mm	M8	4038320	81.6	1161	255	4039420	20.5
			M10	4038330				4039960	
			3/8 UNC	4038340				4039450	
	440	1000 × 1000 mm	M8	4038350	132	685	325	4039430	34.5
			M10	4038360				4039970	
			3/8 UNC	4038370				4039460	

* ± 5%
† Nominal frequency



FEA analysis of standard head expander (1st vertical resonance)

Brüel & Kjær

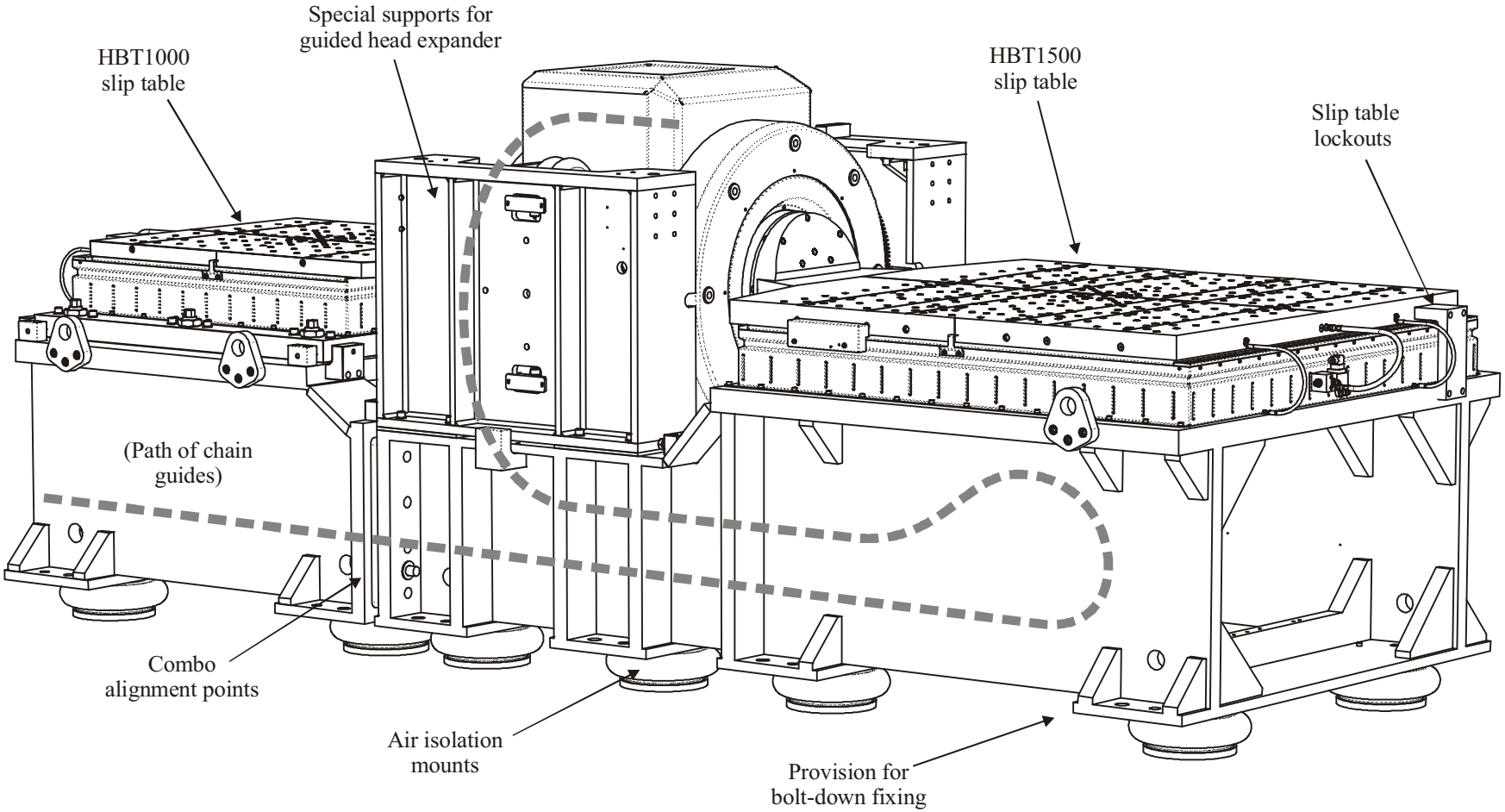


Figure 1 V9-HBT1500/HBT1000 dual combo)

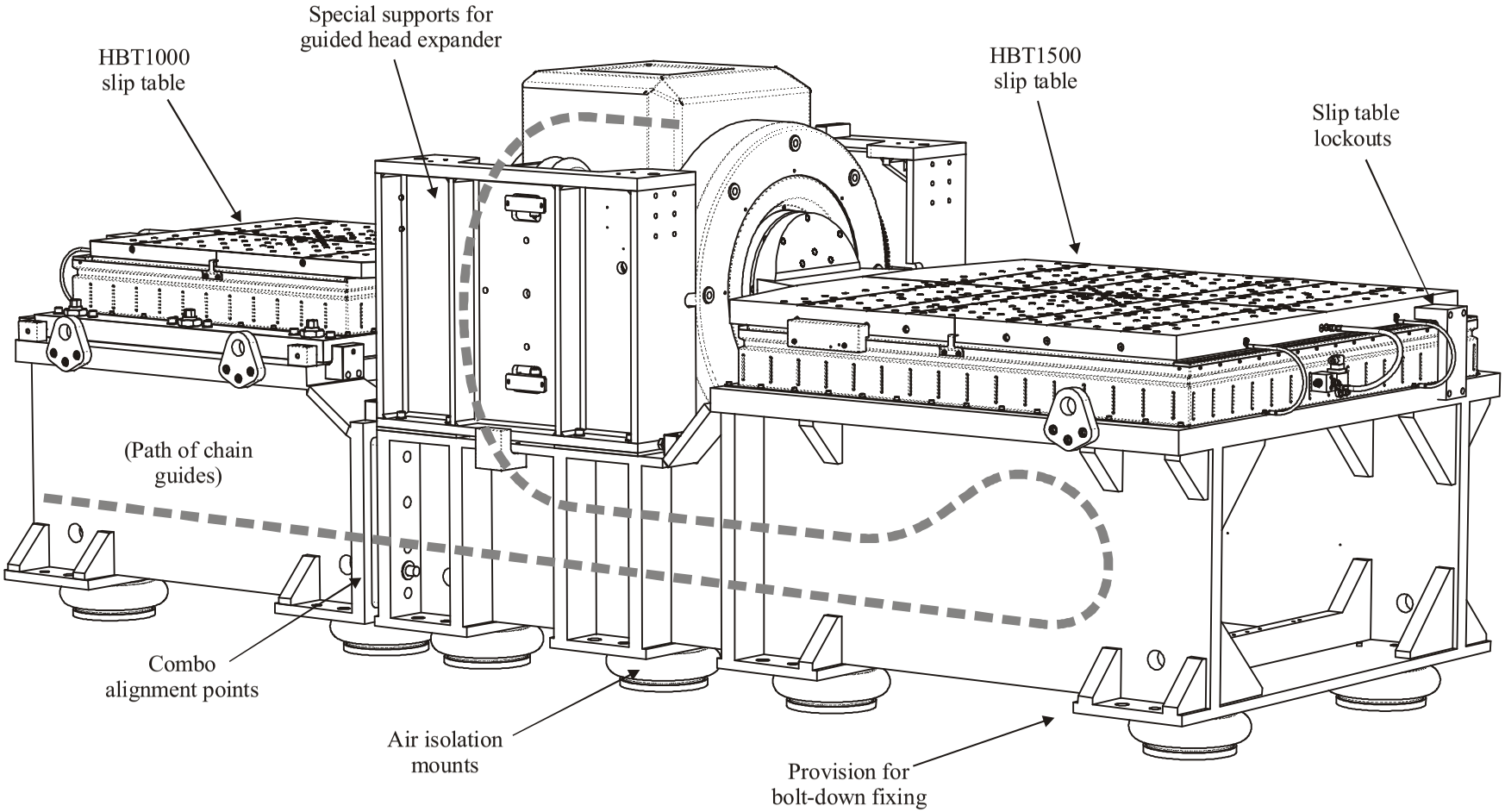
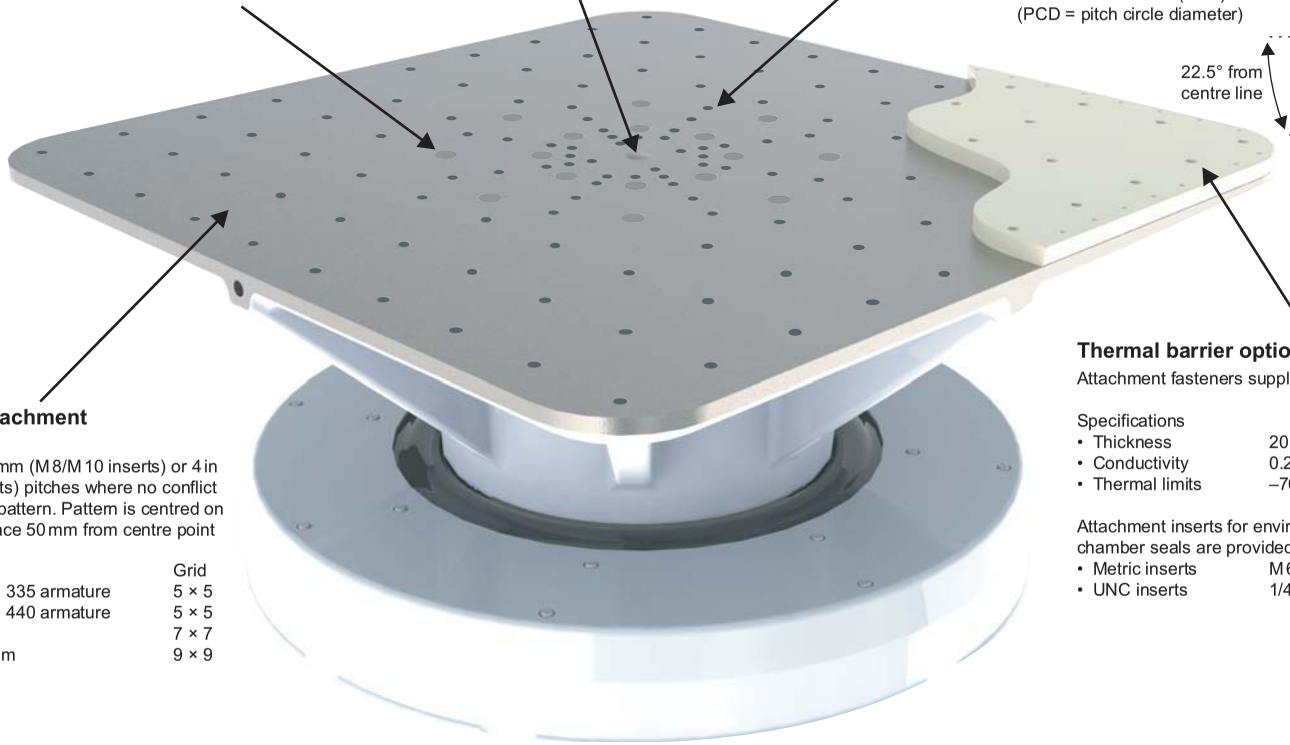
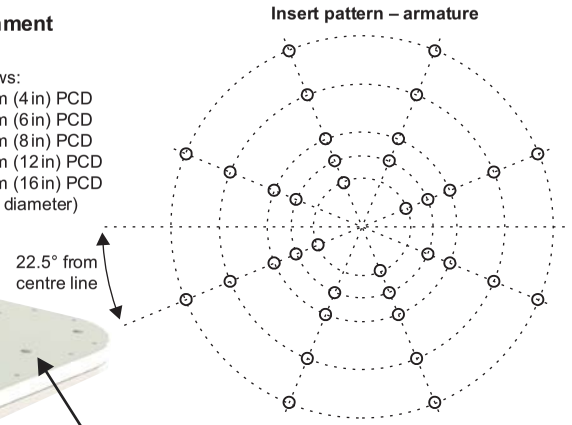


Figure 1 V9-HBT1500/HBT1000 dual combo)

Feature Details and Specifications





100111

Head Expander Kit Contents

Each kit comprises:
- Head expander with keyed payload attachment inserts in grid and armature patterns
- Armature screws, dedicated wrench key and torque wrench
- Lifting eyebolt (attachment points top and bottom)
- Manual and product datasheets

Recommended Options

Accelerometers: IEPE accelerometers with TEDS, side connector, insulated base (cable not included):
- Type 4513-B: 10 mV/g, Handles up to 500 g
- Type 4513-B-001: 100 mV/g, Handles up to 50 g

Compatible Cables: Single screen coaxial, 10–32 UNF (M) to BNC (M), max. +70°C (+158°F):
- AO-0531-D-050: 5 m (16.7 ft)
- AO-0531-D-070: 7 m (23.3 ft)
- AO-0531-D-100: 10 m (33.3 ft)

2010-09
BU 3076 – 11

HEADQUARTERS: Brüel & Kjær Sound & Vibration Measurement A/S · DK-2850 Nærum · Denmark
Telephone: +45 7741 2000 · Fax: +45 4580 1405 · www.bksv.com/lds · info@bksv.com

Local representatives and service organisations worldwide

Brüel & Kjær

1. V9 VIBRATOR

1.1 Specification *(11)*

Armature diameter		**440 mm (17.3 in)**
Sine force, peak (Note 1)	SPA176K	105 kN (23 600 lbf)
	SPA152K	90 kN (20 200 lbf)
Random force, rms (Note 2)	SPA176K	105 kN (23 600 lbf)
	SPA152K	105 kN (23 600 lbf)
Half sine peak shock force (Note 2)	SPA176K	193 kN (43 400 lbf)
	SPA152K	184 kN (41 300 lbf)
Armature resonance (f_n), nominal		2000 Hz
Useable frequency range		d.c. to 2700 Hz
Effective mass of moving element – raised (hex) inserts		49.8 kg (112 lb)
Velocity, sine, peak (Note 1)		3.0 m/s (118 in/s)
Acceleration, sine, peak, flush inserts		1470 m/s² (150 g_n)
Acceleration, random, rms		686 m/s² (70 g_n)
Stray magnetic field (Note 3)		< 1.03 mT (<10.3 gauss)
Armature suspension stiffness:		
Axial		Nil (some bearing stiction)
Cross-axial at insert level		10 kN/mm (685 000 lbf/ft)
Rotational		564 kN m/rad (416 000 lbf ft/rad)

Notes

1. Force and velocity ratings depend on the amplifier driving the vibrator. The tables above detail sine force, random force and velocity ratings when driven by the SPA-K amplifier.
2. Random and shock ratings assume a payload approximately twice the mass of the armature; shock pulse 2 ms. For advice on specific test requirements, contact LDS.
3. Theoretical maximum, measured 150 mm (6 in) above table, full field at normal operating temperature.

1. V9 VIBRATOR

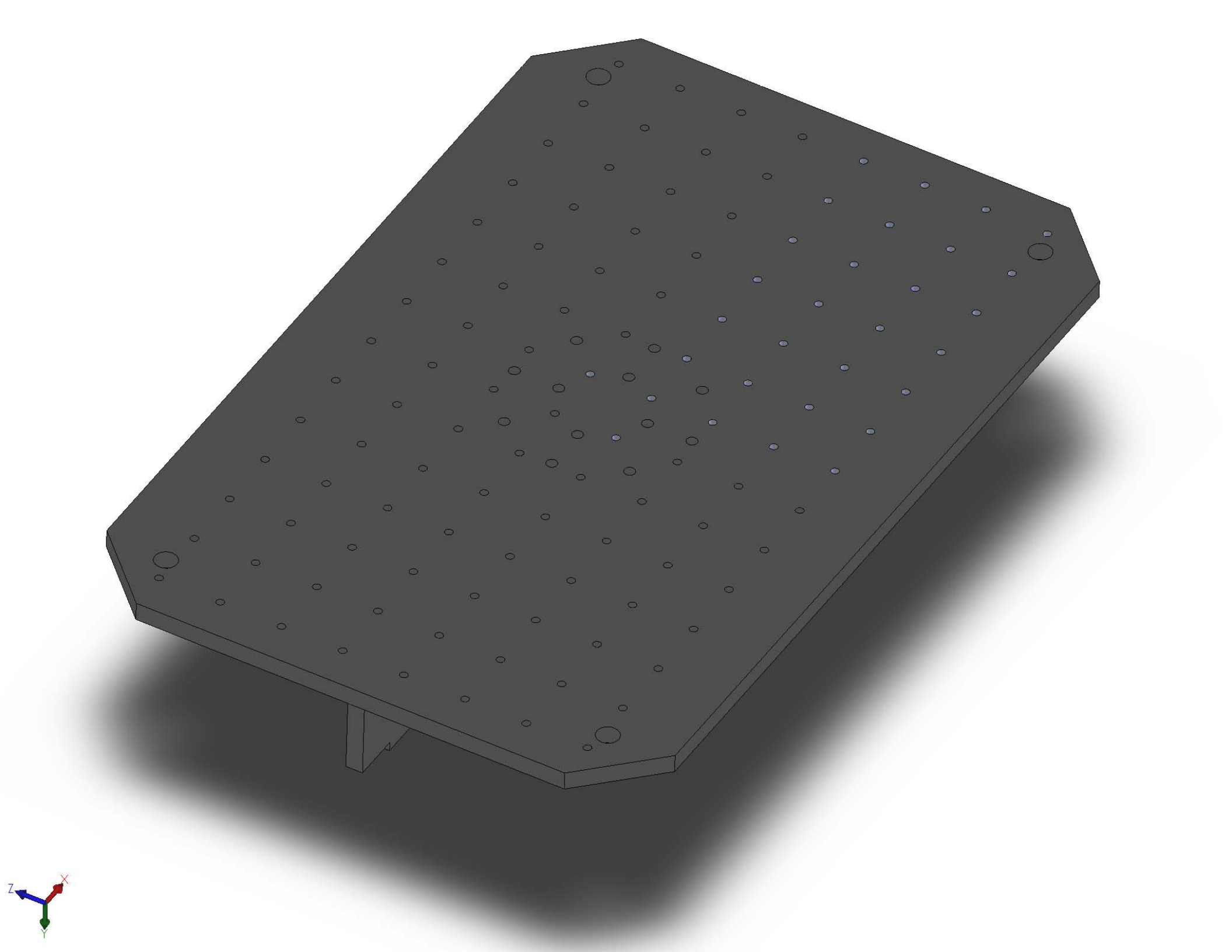
1.1 Specification *(11)*

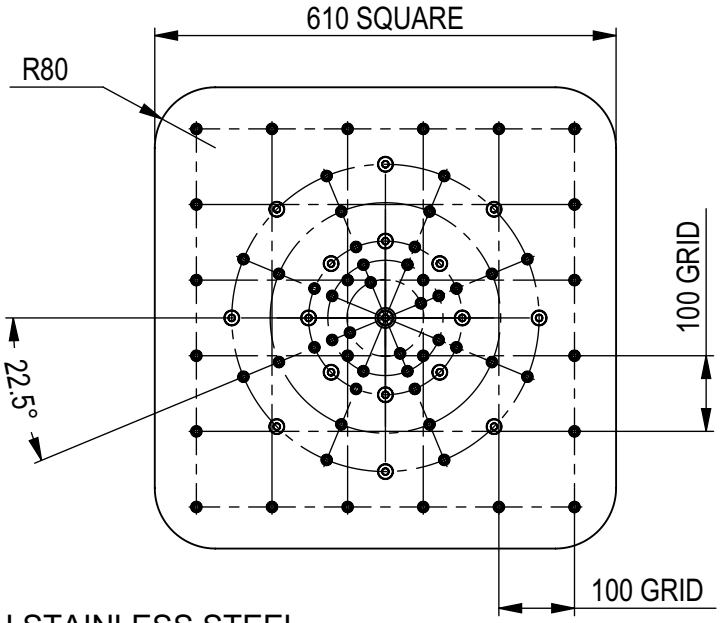
Armature diameter		**440 mm (17.3 in)**
Sine force, peak (Note 1)	SPA176K SPA152K	105 kN (23 600 lbf) 90 kN (20 200 lbf)
Random force, rms (Note 2)	SPA176K SPA152K	105 kN (23 600 lbf) 105 kN (23 600 lbf)
Half sine peak shock force (Note 2)	SPA176K SPA152K	193 kN (43 400 lbf) 184 kN (41 300 lbf)
Armature resonance (f_n), nominal		2000 Hz
Useable frequency range		d.c. to 2700 Hz
Effective mass of moving element – raised (hex) inserts		49.8 kg (112 lb)
Velocity, sine, peak (Note 1)		3.0 m/s (118 in/s)
Acceleration, sine, peak, flush inserts		1470 m/s² (150 g_n)
Acceleration, random, rms		686 m/s² (70 g_n)
Stray magnetic field (Note 3)		< 1.03 mT (<10.3 gauss)
Armature suspension stiffness:		
Axial		Nil (some bearing stiction)
Cross-axial at insert level		10 kN/mm (685 000 lbf/ft)
Rotational		564 kN m/rad (416 000 lbf ft/rad)

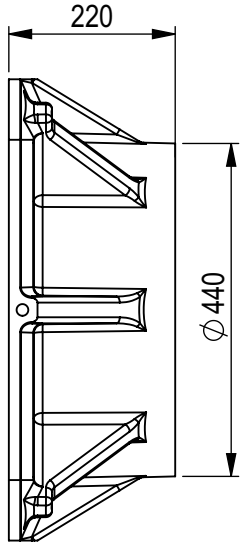
Notes

1. Force and velocity ratings depend on the amplifier driving the vibrator. The tables above detail sine force, random force and velocity ratings when driven by the SPA-K amplifier.
2. Random and shock ratings assume a payload approximately twice the mass of the armature; shock pulse 2 ms. For advice on specific test requirements, contact LDS.
3. Theoretical maximum, measured 150 mm (6 in) above table, full field at normal operating temperature.

4. Release the button and check that the armature returns to mid-position.
5. Repeat in the reverse direction using the ⊖ button.
6. Check that the PIC2 position display changes appropriately in both directions to match the movement of the armature.


Z
X
Y





HOLE DETAILS
60 HOLES FITTED WITH STAINLESS STEEL FLUSH INSERTS AS FOLLOWS:
4 HOLES EQUISPACED ON 101.6 PCD
8 HOLES EQUISPACED ON 152.4 PCD
8 HOLES EQUISPACED ON 203.2 PCD
8 HOLES EQUISPACED ON 304.8 PCD
8 HOLES EQUISPACED ON 406.4 PCD
24 HOLES POSITIONED ON 100 GRID

PARTS LIST:- 4038260 (M8), 4038270 (M10)
ESTIMATED WEIGHT:- 57.4Kg
MATERIAL:- MAGNESIUM

USEABLE FREQUENCY UP TO 2000Hz

Iss.	ECO No. - DESCRIPTION	Eng.	DATE	Chk'd
3	ECO 5/2439 - MODEL REFERENCE CHANGED TO ASSY. WEIGHT UPDATED	JW	21/01/2011	MW
2	ECO 5/2453 REFERENCE TO 3/8UNC INSERT OPTION REMOVED	NJC	20/12/2010	SH

MARK PART (Drg.) No. AND ISSUE No. WHERE SHOWN THUS ⊠

Material
MAGNESIUM

Finish
SEE ASSY 4038260 (M8), 4038270 (M10)

UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES mm
FOR EXPLANATION OF DIMENSIONS & NOTES ETC SEE BS 8888.

GENERAL TOLERANCES:
0 = ±1.0 0.00 = ±0.25
0.0 = ±0.5 ANGLES = ±1°
DRILLED HOLES = ±1% OR ±0.05
(which ever is greater)

HOLE POS. ⌖ Ø 0.25

REMOVE ALL BURRS & SHARP EDGES.

MACHINE WHERE MARKED ✓ SURFACE FINISH VALUES IN µm

THREADS ARE ISO METRIC, COARSE SERIES, TOLERANCE CLASS 6g/6H TO BS 3643.

DESIGNED BY	John Westcott
DATE	10/10/11
CHECKED BY	NC
DATE	11/11/10
PRODUCT	HEAD EXPANDER
PROJECT	Head Expanders
PROJ ENG.	S HOMEWOOD
WEIGHT(Kg)	57.4Kg
STATUS	Released

LDS TEST AND MEASUREMENT

Title
OUTLINE, HEAD EXPANDER 610mm, V850-V9, METRIC

A4	Scale 1:10	Sht: 1 of 1	Drg No. 6006520	Issue 3

DO NOT SCALE - IF IN DOUBT ASK

Intentionally blank

- Digital signal from the SPA152K amplifier indicating that the amplifier is on.
- Filtered analogue input representing the load support pressure.

The following controls can be used during system setup:

+	Injects air into the load support via the armature control valve.
–	Releases air from the load support via the armature control valve.
OK	Toggles the display between displaying control loop diagnostic information and displaying I/O states.
ESC	Toggles the screen backlight.
←↑→↓	Navigate on screen diagnostic information.

4.4 Pneumatics and servo box

The standard pneumatics box described in Manual 4001041 is replaced with a special box mounted on a control stand (Figure 3).

The box (Figure 5) includes components providing the pneumatic servo circuits together with the armature control PLC and its associated transducers and signal connections.

The box has the following external controls:

- emergency stop button and CPS indicator (standard)
- load support supply regulator with output and supply pressure gauges
- LBP output and supply pressure gauges

The following additional controls can be set internally:

- airflow control valves
- PIC2 manual bypass valves

As the pneumatics box is subject to some internal pressure due to relieving air from pressure regulators, a double differential relief valve is fitted in the lower gland plate. The valve automatically equalises pressure differences exceeding 1 lbf/in²; it should be operated manually (by pressing the red button) before opening the enclosure door.

Air pressure regulator nominal settings are:

Armature Supply	2 bar
LBP Supply	4.8 bar

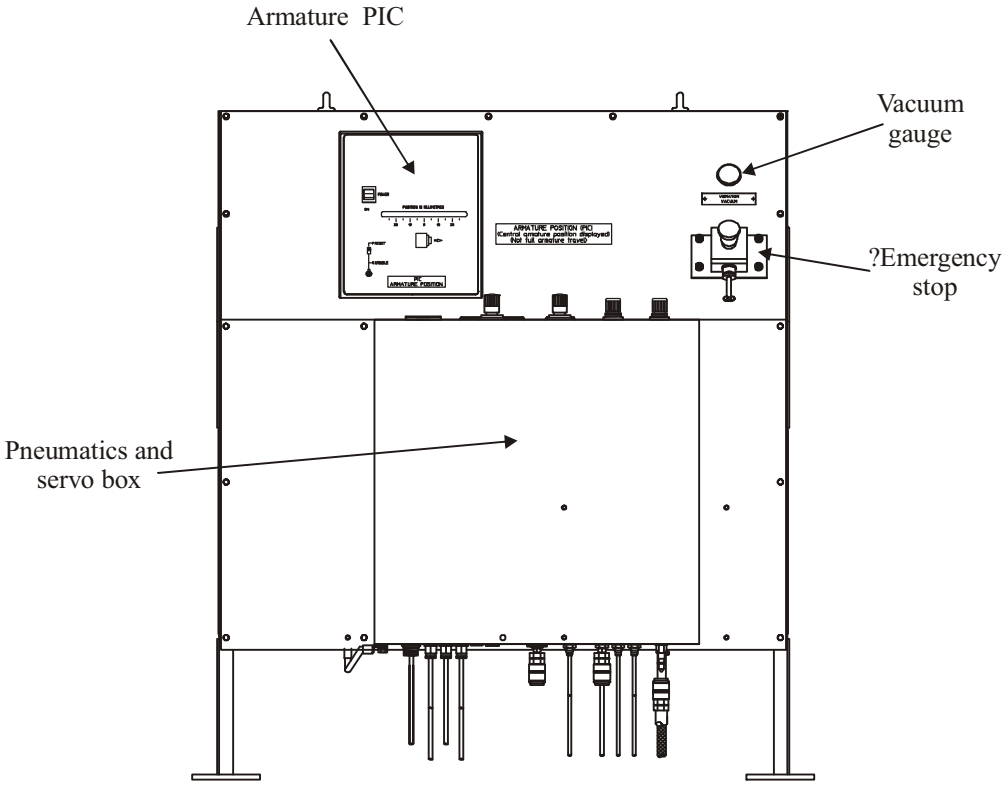


Figure 3 Control stand

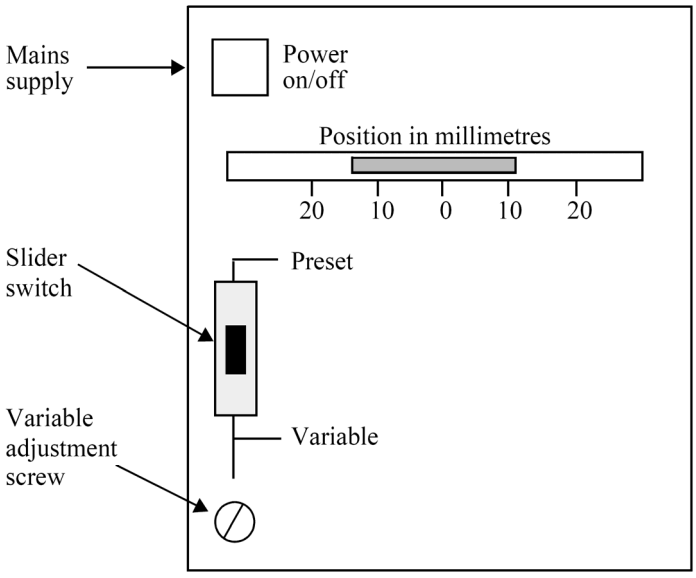


Figure 4 PIC2 control panel

5. LABELLING

5.1 Vibrator and cooling unit

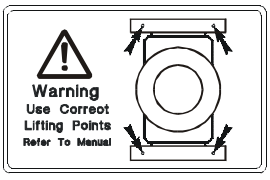
The following textual labels are affixed to the vibrator (and cooling unit where noted):

a) "Danger zone – no unauthorised persons allowed within 2 metres of this equipment"; "Warning – refer to manual before using or moving this equipment"; "Use ear protectors"; "Warning – high temperatures"; "Warning – maximum payload [as stated on label]"

b) "Warning – isolate equipment before removing this cover"

c) "Danger – isolate main supply before opening"

d) "Warning – high temperature" (fan)



e) "Warning – use correct lifting points"

05R/W

AI² SYNTHESIS MODULE

GENERAL MIDI INSTRUMENT

Owner's Manual

AI² Synthesis System

KORG

Ⓔ ①