OPERATING & MAINTENANCE MANUAL

for

DC LOAD BANK

Type

HLBS60-1200

Serial No. M37032

PowerBank

ISSUE 2

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INTRODUCTION

The load bank is designed for DC load testing of UPS equipment or battery discharge testing at load currents up to 1208 amps at a maximum voltage of 60 volts DC.
Nine switched steps are available with a minimum switch step of 40A @ 60V DC.
The unit comprises of pre-set, high powered resistors channels of various rating, with each individual channels selectable via panel mounted switches and internal contactors.
Cable termination is provided via a M12 studs on copper busbars.
The load bank is force cooled using 3 x mains powered 240V single phase fans.
Failure of the auxiliary mains supply or a single fan failure will automatically de-energise the load bank contactors thereby preventing damage to resistor elements.

fig 1: photo shows a HLBS60-1200 load bank

SAFETY CONSIDERATIONS

1. The equipment is designed for use in a clean, dry, indoor environment and should only be operated by competent electrical engineers who are completely familiar with the operation and specification of the load bank.
2. As with any electrical equipment the load bank should not be used in close proximity to recently charged batteries where a buildup of explosive gases may have occurred.
3. Operators must ensure that interconnecting cables are correctly rated to carry the required load current and adequately insulated to prevent the possibility of electric shock.
4. All resistors are rated for operation when force cooled and therefore can only be used when the fans are running
5. Do not attempt connect or disconnect cables with the load circuit energised.
6. When in use the load bank should be cordoned off using safety barriers.
7. The load bank should only be operated in an area with adequate ventilation.
8. During operation care should be taken as the exhaust air outlet will become hot.
9. Do not smoke in the proximity of batteries.
10. Operators working with batteries should not wear rings, jewellery or metal watch straps.
11. Only insulated tools should be used when working on battery connections.
12. Refer to UPS or the battery manufacturer's operating instructions for additional safety precautions.
13. Ensure all personnel are familiar with the location of the nearest safety kit and eyewash facility.
14. During operation the load bank should not be covered or positioned to restrict air flow.
15. Caution metal surfaces will become hot during operation
16. Always run the fans for several minutes after a test, with the load switched off to cool the resistor elements.

fig 2: photo shows air inlet side of a HLBS60-1200 load bank

CONNECTION PROCEDURE

A. Ensure the equipment or batteries to be tested are compatible with the load bank operating voltage range.
B. Do not attempt to operate the load bank above the maximum operating voltage.
C. Check all switches are in the off position.
D. Check the power source (battery or UPS output) is isolated before connecting the DC load test cables to the load bank.
E. Connect the load DC test cables to the busbars behind the removable panel on the front of the load bank.
F. Ensure the interconnecting cables are adequately rated and correctly insulated to prevent any possibility of electric shock.
G. Check all cables are connected to the correct terminals on the battery or UPS and the connections are secure.
H. Ensure the auxiliary mains supply is available at 240 volts single phase.
I. Connect the mains lead to the 240 volt auxiliary supply.
J. Observe correct polarity when connecting a battery for discharge testing.
K. Where practical always earth the load bank during use.

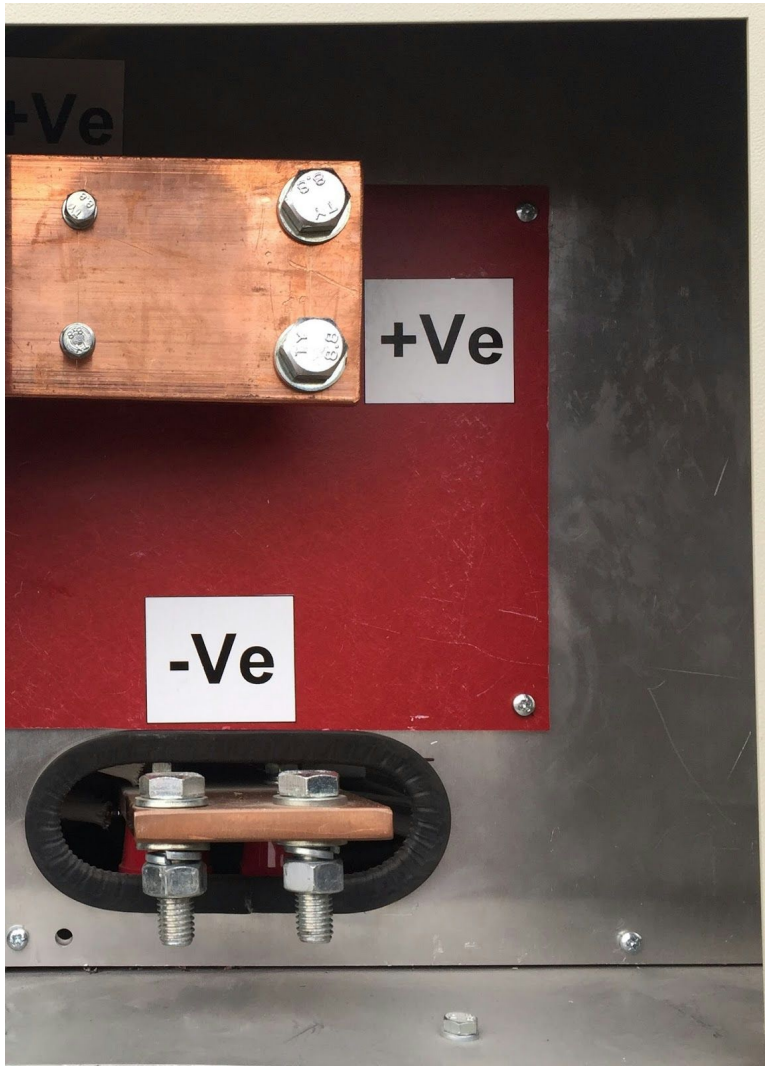

fig 3: photo shows the busbar connection points in the load bank

OPERATING INSTRUCTIONS

Operators should read the safety considerations and connection procedure before carrying out the following operating instructions.

1. Ensure the mains supply switch is in the OFF position.
2. Ensure the auxiliary supply is 240 volts AC single phase 50/60 Hz
3. Ensure all switches are in the OFF position.
4. Turn on the mains control rocker switch.
5. Ensure the fan is running correctly and the inlet and exhaust ventilation are not obstructed.
6. Press the “Start” push button.
7. Select the required load current by operating the appropriate switches.
8. Do not exceed the maximum rating of the load bank.
9. The load bank can be used to perform a constant current battery discharge test by manual selection of the load channels during the test, as the battery voltage falls.
10. At the end of a test switch off all load switches and press the red “stop” push button.
11. Also at the end of a test, the mains control rocker switch should be left on for a few minutes until the resistors have cooled.
12. Ensure the power source (battery or UPS output) is isolated before removing the load test cables from the load bank. Note: Always disconnect the cable connections at the battery terminals or UPS first.

fig 4: photo shows the control panel of the HLB30-800X Load Bank

RATING TABLE

Channel	Ohms	I @ 60V	W @ 60V	I @ 48V	W @ 48V	I @ 24V	W @ 24V
1	1.500	40.00	2400.00	32.00	1536.00	16.00	384.00
2	0.833	72.00	4320.02	57.60	2764.81	28.80	691.20
3	0.469	128.00	7680.00	102.40	4915.20	51.20	1228.80
4	0.462	130.00	7800.14	104.00	4992.09	52.00	1248.02
5	0.426	141.01	8460.63	112.81	5414.81	56.40	1353.70
6	0.400	150.00	9000.00	120.00	5760.00	60.00	1440.00
7	0.385	156.01	9360.37	124.80	5990.64	62.40	1497.66
8	0.309	194.01	11640.31	155.20	7449.80	77.60	1862.45
9	0.305	197.04	11822.66	157.64	7566.50	78.82	1891.63
Total	0.050	1208.07	72484.14	966.46	46389.85	483.23	11597.46

SPECIFICATION

Type ref.	**HLBS60-1200**
Nominal Voltage	48VDC
Maximum Voltage	60VDC
Max current @ 60V (see note 4)	1208 amps
Max power dissipated	72480W
Max constant current at 48VDC volts	933 amps
Switched steps (see note 4)	1 x 40A, 1 x 72A, 1 x 128A, 1 x 130A, 1 x 141A, 1 x 150A, 1 x 156A, 1 x 194A, 1 x 197A
Current adjustment (see note 1)	Zero to max amps
Test voltage sockets	4 mm shrouded (DC volts direct reading)
Shunt	1mV = 10A
Protection	Fan Failure & Auxiliary Mains Failure
Auxiliary mains supply	240Volt, 50/60Hz
DC power cable set	5 metres (3 x 150mm2 Single Core)
Load Type Connectors	Busbar
Case size	Length: 1080 mm Width: 650 mm Height: 1420 mm
Weight (approx.)	179 Kgs
Finish	RAL 7032
Environmental protection rating	IP20
Movement	Swivel castors & Fork Pockets
Operating temperature range	0 – 40 deg C
Storage temperature range	0 – 80 deg C

Specification Notes

1. The maximum current is stated at the maximum operating voltage. The equipment is designed for discharge testing lead acid cells, where the terminal voltage will quickly fall to approx. 2.08 volts per cell at the start of the discharge test.
2. Discharges can be achieved below 60 volts with proportionally reduced output current (see performance tables)
3. Units are designed for indoor use only in a clean, dry and well ventilated environment.
4. Approx current rating at 60 volt - (60V is the maximum voltage).
5. External digital multimeters are not supplied with the load bank.
6. Information is intended to be correct at the time of publication, however, Hillstone Products Ltd bears no responsibility for the accuracy of any information given.
7. We reserve the right to make detail changes to specification, components, dimensions or weights at the time of design or manufacture without prior notice.
8. All information in this manual is the copyright of Hillstone Products Ltd.
9. All designs and software are the intellectual property of Hillstone Products Ltd.

MAINTENANCE PROCEDURES

The load bank should not require any special maintenance, however as with any electrical equipment periodic checks should be carried out to ensure the equipment is in a safe and satisfactory condition.

The following periodic checks are recommended ;

1) Check the inlet and outlet grills are free from obstruction.
2) Check the controls and terminal shrouds are undamaged.
3) Check the fan rotates freely without obstruction.
4) Check internal wiring for loose connections or damage.

FAULT FINDING PROCEDURES

The following fault finding procedure is intended to identify simple operational errors and has been categorised into two possible problem areas as follows ;

FAN COOLING NOT OPERATIONAL

Check the power source is available and switched ON.
Check the auxiliary mains cable connections.
Check the auxiliary mains fuse in the front panel mains socket
Always replace fuses with the correct rating (see specification)
Check the fan motor operates.
Check for air blockage.
Check fan blades are secure to motor shaft.

LOAD BANK DOES NOT PROVIDE SUFFICIENT LOAD CURRENT

Check the power source is at the required voltage.
Check the load cables are secure.
Check the load cables are inserted correctly.
Check the required current channels have been selected.
Compare the current values with the specification table.
Identify individual current channels for reduced output.

Any faults not corrected by carrying out the above procedures may require the internal wiring or components of the load bank to be inspected for damage.

Important Note:

Isolate the load bank from all sources of power before removing any covers. Testing the load bank with the covers removed should not be carried out as it presents a risk of injury or death by electric shock. Repair or replacement should be carried out by the manufacturer.

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Certificate of Conformity

Customer	Hillstone
Customer order number	37032
Hillstone Manufacturing ref	M37032
Equipment type ref	HLBS60-1200
Equipment description	Load bank
Quantity supplied	1
Date of manufacture	October 2014

Note:-

This document certifies that the whole of the items detailed above have been manufactured, tested and inspected and unless otherwise stated conform in all respects with the requirements of the contract or order and in accordance with the following.

- Low Voltage Directive 2006/95/EC
- EMC directive 2004/108/EC:
  - BSEN61000-6-3 2007 amendments for 2011
  - BSEN61000-6-1
  - BSEN61000-6-4
- Hillstone Products Quality Assurance procedures ISO9001:2008