OPERATING MANUAL

for

HILLSTONE AC / DC LOAD BANK

Type ref. HLB 60-120-17

Serial No. M36608

ISSUE 1

CONTENTS

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INTRODUCTION

The load bank is designed for load testing of single phase UPS equipment, gen-sets or battery discharge testing at load currents up to 303 amps at a nominal voltage of 60V, or 151.5A at a nominal voltage 120V AC or DC.
Ten switched steps are available with a minimum switch step of 1A.
The equipment incorporates a dual voltage feature which allows double load current at 60V (position 'B') operation.
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 two double Anderson connectors.
The load bank is force cooled using a mains powered 230V single phase fan.
Failure of the auxiliary mains supply or fan failure will automatically de-energise the load contactors thereby preventing damage to resistor elements.
The load bank is also fitted with an emergency stop button which will de-energise the load contactors and the fan.
Under normal operation the fan should be kept running for 5 minutes after test to ensure the resistors are cooled sufficiently.

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 build up 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 fan is running
5. Do not attempt to insert or remove the Anderson connectors 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 be 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 manufacturers operating instructions for additional safety precautions.
13. Ensure all personnel are familiar with the location of the nearest safety kit and eye wash facility.
14. During operation the load bank should not be covered or positioned to restrict air flow.
15. Caution metal surfaces will be hot during operation
16. Always run the fan for several minutes after a test, with the load switched off to cool the resistor elements.

CONNECTION PROCEDURE

1. Ensure the equipment or battery to be tested is compatible with the load bank operating voltage range.
2. Do not attempt to operate the load bank above the maximum operating voltage.
3. Check the power source (battery or UPS output) is isolated before connecting any cables to the load bank.
4. Check all switches are in the off position.
5. Ensure the interconnecting cable is adequately rated and correctly insulated to prevent any possibility of electric shock.
6. The connections **must be** in position ‘A’ with the cables connected to the 120V connections for any test above 60 volts AC or DC.
7. Test carried out below 60V can be connected to the 60V position ‘B’ connections.
8. The connections should be in position ‘A’ for tests up to 151 amps and moved to position ‘B’ for tests over 151 amps.
9. The connections **must not** be moved when the battery or power source is connected.
10. Check all cables are connected to the correct terminals and the Anderson connector position is correct for the battery test voltage.
11. Ensure the interconnecting cable connections are secure.
12. Ensure the auxiliary mains supply is available at 230 volts single phase.
13. Connect the auxiliary mains lead to the 230 volt auxiliary supply.
14. Connect the load bank to the battery or UPS output.
15. Observe correct polarity when connecting a battery for discharge testing.
16. Where practical always earth the load bank during use.

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 230 volts AC single phase 50 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 load channel 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 channel 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.
13. Always disconnect the cable connections at the battery terminals or UPS first.
14. The Anderson connectors can now be removed from the load bank.

SPECIFICATION

Maximum operating voltage	130 Volts or 65 Volts AC or DC
Nominal operating voltage	120 Volts or 60 Volts AC or DC
Maximum load current	147 Amps @ 120 Volts AC or DC
	290 Amps @ 60 Volts AC or DC
Load cable set	3 metres
Aux mains panel fuse rating	5 Amps (20mm x 5 mm mains socket mounted)
Aux mains cable	3 metres complete with IEC and UK 13A plug
Size	1020 mm long x 550 mm wide x 790 mm high
Weight	53 kgs

RATING TABLES

120V connection (link position A)

Approximate Current At Different Voltages

Channel	Circuit Ohms	I @ 130V	W @ 130V	I @ 120V	W @ 120V	I @ 110V	W @ 110V
1	254.00	0.51	66.54	0.47	56.69	0.43	47.64
2	122.00	1.07	138.52	0.98	118.03	0.90	99.18
3	61.00	2.13	277.05	1.97	236.07	1.80	198.36
4	30.00	4.33	563.33	4.00	480.00	3.67	403.33
5	16.00	8.13	1,056.25	7.50	900.00	6.88	756.25
6	8.00	16.25	2,112.50	15.00	1,800.00	13.75	1,512.50
7	5.00	26.00	3,380.00	24.00	2,880.00	22.00	2,420.00
8	2.57	50.58	6,575.88	46.69	5,603.11	42.80	4,708.17
9	2.57	50.58	6,575.88	46.69	5,603.11	42.80	4,708.17
Total	0.8146	159.58	20,745.94	147.31	17,677.02	135.03	14,853.60

120V connection (link position A) continued

Approximate Current At Different Voltages

Channel	Circuit Ohms	I @ 100V	W @ 100V	I @ 80V	W @ 80V	I @ 60V	W @ 60V
1	254.00	0.39	39.37	0.31	25.20	0.24	14.17
2	122.00	0.82	81.97	0.66	52.46	0.49	29.51
3	61.00	1.64	163.93	1.31	104.92	0.98	59.02
4	30.00	3.33	333.33	2.67	213.33	2.00	120.00
5	16.00	6.25	625.00	5.00	400.00	3.75	225.00
6	8.00	12.50	1,250.00	10.00	800.00	7.50	450.00
7	5.00	20.00	2,000.00	16.00	1,280.00	12.00	720.00
8	2.57	38.91	3,891.05	31.13	2,490.27	23.35	1,400.78
9	2.57	38.91	3,891.05	31.13	2,490.27	23.35	1,400.78
Total	0.8146	122.76	12,275.71	98.21	7,856.45	73.65	4,419.25

60V connection (link position B)

Approximate Current At Different Voltages

Channel	Circuit Ohms	I @ 65V	W @ 65V	I @ 60V	W @ 60V	I @ 48V	W @ 48V
1	60.00	1.08	70.42	1.00	60.00	0.80	38.40
2	32.00	2.03	132.03	1.88	112.50	1.50	72.00
3	15.00	4.33	281.67	4.00	240.00	3.20	153.60
4	8.00	8.13	528.13	7.50	450.00	6.00	288.00
5	4.00	16.25	1,056.25	15.00	900.00	12.00	576.00
6	2.00	32.50	2,112.50	30.00	1,800.00	24.00	1,152.00
7	1.30	50.00	3,250.00	46.15	2,769.23	36.92	1,772.31
8	0.65	100.00	6,500.00	92.31	5,538.46	73.85	3,544.62
9	0.65	100.00	6,500.00	92.31	5,538.46	73.85	3,544.62
Total	0.2068	314.32	20,430.99	290.14	17,408.65	232.12	11,141.54

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 lose 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 auxiliary 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 to be tested is at the required voltage.
Check the load cables are secure.
Check the load cable connectors 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 Hire
Customer order number	36608
Hillstone Manufacturing ref	M36608
Equipment type ref	HLB60-120-17
Equipment description	Load bank
Quantity supplied	1
Date of manufacture	January 2009

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 73/23/EEC amended to 93/68/EEC 1993
- EMC directive 89/336/EEC: EN50081 Part1: 1993
- Hillstone Products Quality Assurance procedures ISO9001:2008