



OPERATING MANUAL

for

HILLSTONE DC LOAD BANK

Type ref. HLD 240-480-100

Serial No. M36771

ISSUE 1

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UNITS 1 & 2
Freetown Business Park
Hudcar Lane, Bury
Lancashire England BL9 6HD
Tel +44(0)161 763 3100
Fax +44(0)161 763 3158
www.hillstone.co.uk
Email sales@hillstone.co.uk

INTRODUCTION

The load bank is designed for load testing of DC equipment at load currents up to 200 amps at a nominal voltage of 240V, or 200 amps at a nominal voltage 480V DC.

Ten switched steps are available with a minimum switch step of 1A.

The equipment incorporates a dual voltage feature which allows equipment to be tested up to 240 volts and up to 480 volts.

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 power locks on the front of the load bank. **Care must be taken when selecting the correct power lock for the test voltage.**

The load bank is force cooled using a mains powered 415V three 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 remove the power locks 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 become 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. For any tests above 240 volts DC the power locks must be connected to the red 480V power lock and the black 0 volt power lock
7. For tests carried out below 240V only then can the power locks be connected to the red 240V power lock and the black 0 volt power lock.
8. The power locks **must not** be removed when the battery or power source is connected.
9. Check all cables are connected to the correct power lock terminals for the battery test voltage.
10. Ensure the interconnecting cable connections are secure.
11. Ensure the auxiliary mains supply is available at 415 volts three phase.
12. Connect the auxiliary mains lead to the 415 volt auxiliary supply.
13. Connect the load bank to the battery or UPS output.
14. Observe correct polarity when connecting a battery for discharge testing.
15. 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 415 volts AC three phase 50 Hz.
3. Ensure all switches are in the OFF position
4. Turn on the mains control ON/OFF rocker switch.
5. Ensure the fan is running correctly and the inlet and exhaust ventilation are not obstructed.
6. If the red LED below the mains ON/OFF switch is illuminated, then the fan motor needs reversing. This can be changed by removing the auxiliary supply, changing over 2 of the phases from the auxiliary supply, then reconnecting the auxiliary supply.
7. Press the "Start" push button.
8. Select the required load current by operating the appropriate load channel switches.
9. Do not exceed the maximum rating of the load bank.
10. 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.
11. At the end of a test, switch off all load channel switches and press the red "stop" push button.
12. At the end of a test, the mains control rocker switch should be left on for a few minutes to allow the fan to run until the resistors have cooled.
13. Ensure the power source (battery or UPS output) is isolated.

14. Always disconnect the cable connections at the battery terminals or UPS first.
 15. The test cables can now be removed from the load bank.

SPECIFICATION

Maximum operating voltage	520 Volts or 260 Volts DC
Nominal operating voltage	480 Volts or 240 Volts DC
Maximum load current	221 Amps @ 520 Volts DC 221 Amps @ 260 Volts DC
Load cable set	5 metres
DC Shunt	300A/75mV, 1A = 4mV
Aux mains cable	5 metres complete with trailing socket
Size	1070 mm long x 800 mm wide x 1100 mm high
Weight	174 kgs

RATING TABLES

480V connection (520V MAX)

Approximate Current and Power At Different Voltages

Channel	Ohms @ 480V	I @ 520V	W @ 520V	I @ 480	W @ 480V	I @ 400V	W @ 400V	I @ 286V	W @ 286V
1	691.89	0.75	390.81	0.69	333	0.58	231.25	0.41	118.22
2	345.95	1.50	781.62	1.39	666	1.16	462.49	0.83	236.44
3	172.90	3.01	1,563.91	2.78	1,333	2.31	925.39	1.65	473.08
4	115.20	4.51	2,347.22	4.17	2,000	3.47	1,388.89	2.48	710.03
5	57.60	9.03	4,694.44	8.33	4,000	6.94	2,777.78	4.97	1,420.07
6	38.40	13.54	7,041.67	12.50	6,000	10.42	4,166.67	7.45	2,130.10
7	19.20	27.08	14,083.33	25.00	12,000	20.83	8,333.33	14.90	4,260.21
8	9.60	54.17	28,166.67	50.00	24,000	41.67	16,666.67	29.79	8,520.42
9	9.60	54.17	28,166.67	50.00	24,000	41.67	16,666.67	29.79	8,520.42
10	9.60	54.17	28,166.67	50.00	24,000	41.67	16,666.67	29.79	8,520.42
Totals		221.93	115,403.01	204.86	98,331.56	170.71	68,285.80	122.06	34,909.41

240V connection (260V Max)

Approximate Current and Power At Different Voltages

Channel	Ohms @ 240V	I @ 260V	W @ 260V	I @ 240	W @ 240V	I @ 220V	W @ 220V	I @ 120V	W @ 120V
1	345.80	0.75	195.49	0.69	167	0.64	139.97	0.35	41.64
2	172.90	1.50	390.98	1.39	333	1.27	279.93	0.69	83.29
3	86.45	3.01	781.95	2.78	666	2.54	559.86	1.39	166.57
4	57.60	4.51	1,173.61	4.17	1,000	3.82	840.28	2.08	250.00
5	28.80	9.03	2,347.22	8.33	2,000	7.64	1,680.56	4.17	500.00
6	19.20	13.54	3,520.83	12.50	3,000	11.46	2,520.83	6.25	750.00
7	9.60	27.08	7,041.67	25.00	6,000	22.92	5,041.67	12.50	1,500.00
8	4.80	54.17	14,083.33	50.00	12,000	45.83	10,083.33	25.00	3,000.00
9	4.80	54.17	14,083.33	50.00	12,000	45.83	10,083.33	25.00	3,000.00
10	4.80	54.17	14,083.33	50.00	12,000	45.83	10,083.33	25.00	3,000.00
Totals		221.93	57,701.75	204.86	49,165.99	187.79	41,313.09	102.43	12,291.50

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 auxiliary power source is available and switched ON.

If the red LED below the ON/OFF switch is illuminated then the phase sequence of the auxiliary supply is incorrect and must be reversed.

Check the auxiliary mains cable connections.

Check the auxiliary mains fuse in the front panel mains socket

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.

	<p>Units 1 & 2 Freetown Business Park Hudcar Lane, Bury, Lancs. BL9 6HD. UK Tel: +44(0) 161 763 3100 Fax: +44(0) 161 763 3158</p>
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Certificate of Conformity

Customer	Hillstone Hire
Customer order number	36771
Hillstone Manufacturing ref	M36771
Equipment type ref	HLD240-480-100
Equipment description	Load bank
Quantity supplied	1
Date of manufacture	February 2012

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