



OPERATING MANUAL

for

HILLSTONE AC / DC LOAD BANK

Type ref. HLB 120-240-78

Serial number M36440

ISSUE 1

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UNIT 2
Portland Industrial Estate
Portland St Bury
Lancashire England BL9 6EY
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 single phase UPS equipment, gen-sets or battery discharge testing at load currents up to 600 amps at a maximum voltage of 130V, or 300A at a maximum voltage 260V AC or DC, 78 KW.

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

The equipment incorporates a dual voltage feature which allows double load current at 130V 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 a removable side mounted terminal cover, which also allows access to the interchangeable “ double current” link feature.

The load bank is force cooled using mains powered 230V single phase fans.

Failure of the auxiliary mains supply or individual fan failure will automatically de-energise the load contactors thereby preventing damage to resistor elements.

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 when operating at high voltages..
4. All resistors are rated for operation when force cooled and therefore can only be used when all fans are running
5. Do not attempt to open the terminal cover, insert or remove the battery power leads, or move the selector link with the load circuit energised from a battery or AC power source.
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 the care should be taken as to 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 fans for several minutes after a test, with the load switched off to cool the resistor elements.

CONNECTION PROCEDURE

- A. Ensure the equipment or battery to be tested is compatible with the load bank operating voltage range.
- B. Do not attempt to operate the load bank above the maximum operating voltage.
- C. Check the power source (battery or UPS output) is isolated before removing the terminal cover or connecting any cables to the load bank.
- D. Check the all switches are in the off position.
- E. Ensure the interconnecting cable is adequately rated and correctly insulated to prevent any possibility of electric shock.
- F. The connection link must be in position 'A' and the cables connected to 260V +ve & 0-ve for any test above 130 volts AC or DC.
- G. Test carried out below 130V should be connected to the 130V +ve & 0 –ve terminals. The link should be in position 'A' for tests up to 300 amps and moved to position 'B' for tests over 300 amps.
- H. The link must not be moved when the battery or power source is connected.
- I. Check all cables are connected to the correct terminals and the link position is correct for the battery test voltage.
- J. Ensure the interconnecting cable connections are secure.
- K. Replace the termination cover before connecting the UPS or battery.
- L. Ensure the auxiliary mains supply is available at 230 volts single phase.
- M. Connect the mains lead to the 230 volt auxiliary supply.
- N. Connect the load bank to the battery or UPS output.
- O. Observe correct polarity when connecting a battery for discharge testing.
- P. 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 fans are running correctly and the inlet and exhaust ventilation is not obstructed.
6. Press the green "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, with the fans running for a few minutes until the resistors have cooled.
12. Ensure the power source (battery or UPS output) is isolated before opening the terminal cover or removing the load power cables from the load bank or changing the link position.
13. Always disconnect the cable connections at the battery terminals first.

SPECIFICATION

Maximum operating voltage	130 Volts or 260 Volts AC or DC
Maximum load current	600 Amps @ 130 Volts AC or DC 300 Amps @ 260 Volts AC or DC
Shunt rating	600A DC (1mV = 10A)
Mains panel fuse rating	5 Amps (20mm x 5 mm mains socket mounted)
Mains cable	2 metres complete with IEC and UK 13A plug
Termination	Internally mounted, M12, stud terminations
Size	1000 mm wide x 600 mm deep x 1320 mm high
Weight	146 Kgs

RATING TABLES**260V connection (link position A)**

Switch Number	Approx Ohms	Approximate Current Available At Different Voltages							
		260V	240V	220V	200V	180V	120V	110V	100V
1	260.0	1.0	0.9	0.8	0.8	0.7	0.5	0.4	0.4
2	130.0	2.0	1.8	1.7	1.5	1.4	0.9	0.8	0.8
3	65.0	4.0	3.7	3.4	3.1	2.8	1.8	1.7	1.5
4	28.8	9.0	8.3	7.6	6.9	6.3	4.2	3.8	3.5
5	14.4	18.1	16.7	15.3	13.9	12.5	8.3	7.6	6.9
6	7.2	36.1	33.3	30.6	27.8	25.0	16.7	15.3	13.9
7	7.2	36.1	33.3	30.6	27.8	25.0	16.7	15.3	13.9
8	7.2	36.1	33.3	30.6	27.8	25.0	16.7	15.3	13.9
9	4.8	54.1	49.9	45.7	41.6	37.4	24.9	22.9	20.8
10	4.8	54.1	49.9	45.7	41.6	37.4	24.9	22.9	20.8
11	4.8	54.1	49.9	45.7	41.6	37.4	24.9	22.9	20.8
Total		304.6	281.1	257.7	234.3	210.9	140.6	128.9	117.1

130V connection (link position A)

Switch Number	Approx Ohms	Approximate Current Available At Different Voltages							
		130V	120V	110V	100V	60V	54V	48V	43V
1	260.0	0.5	0.5	0.4	0.4	0.2	0.2	0.2	0.2
2	130.0	1.0	0.9	0.8	0.8	0.5	0.4	0.4	0.3
3	65.0	2.0	1.8	1.7	1.5	0.9	0.8	0.7	0.7
4	28.8	4.5	4.2	3.8	3.5	2.1	1.9	1.7	1.5
5	14.4	9.0	8.3	7.6	6.9	4.2	3.8	3.3	3.0
6	7.2	18.1	16.7	15.3	13.9	8.3	7.5	6.7	6.0
7	7.2	18.1	16.7	15.3	13.9	8.3	7.5	6.7	6.0
8	7.2	18.1	16.7	15.3	13.9	8.3	7.5	6.7	6.0
9	4.8	27.0	24.9	22.9	20.8	12.5	11.2	10.0	8.9
10	4.8	27.0	24.9	22.9	20.8	12.5	11.2	10.0	8.9
11	4.8	27.0	24.9	22.9	20.8	12.5	11.2	10.0	8.9
Total		152.3	140.6	128.9	117.1	70.3	63.3	56.2	50.4

130V connection (link position B)

Switch Number	Approx Ohms	Approximate Current Available At Different Voltages							
		130V	120V	110V	100V	60V	54V	48V	43V
1	65.0	2.0	1.8	1.7	1.5	0.9	0.8	0.7	0.7
2	32.5	4.0	3.7	3.4	3.1	1.8	1.7	1.5	1.3
3	16.3	8.0	7.4	6.8	6.2	3.7	3.3	3.0	2.6
4	8.1	16.0	14.8	13.5	12.3	7.4	6.6	5.9	5.3
5	4.1	32.0	29.5	27.1	24.6	14.8	13.3	11.8	10.6
6	1.8	72.2	66.7	61.1	55.6	33.3	30.0	26.7	23.9
7	1.8	72.2	66.7	61.1	55.6	33.3	30.0	26.7	23.9
8	1.8	72.2	66.7	61.1	55.6	33.3	30.0	26.7	23.9
9	1.2	108.3	100.0	91.7	83.3	50.0	45.0	40.0	35.8
10	1.2	108.3	100.0	91.7	83.3	50.0	45.0	40.0	35.8
11	1.2	108.3	100.0	91.7	83.3	50.0	45.0	40.0	35.8
Total		603.7	557.2	510.8	464.4	278.6	250.8	222.9	199.7

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 rotate 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 power source is available and switched ON.

Check the mains cable connections.

Check the 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 cable is 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.

Note :

**Isolate the load bank from all power sources before removing any covers.
Testing the load bank with the covers removed is not recommended as high voltages can be present on internal components and the air flow is reduced.**

Repair or replacement should be carried out by the manufacturer.