



# OPERATING MANUAL

for

# TYPE HLB140-230

issue 3

Serial No. M36153-2

HILLSTONE HIRE FLEET

**CONTENTS**

**INTRODUCTION..... 2**

**SAFETY CONSIDERATIONS..... 2**

**CONNECTION PROCEDURE ..... 3**

**OPERATING INSTRUCTIONS ..... 3**

**SPECIFICATION..... 4**

**TYPICAL PERFORMANCE TABLE ..... 4**

**MAINTENANCE PROCEDURES..... 5**

**FAULT FINDING PROCEDURES..... 5**

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## **INTRODUCTION**

The load bank HLB140-230 is designed for battery discharge testing, rectifier testing up to 140V at 230A maximum up to 32KW DC and single phase 110 / 120V AC UPS or generators testing.

The top panel contains the control switches and the mains input socket.

The unit comprises of pre-set, force cooled, high powered resistor channels which allows manual adjustment of the load current.

Shrouded test sockets are included to allow the test voltage or currents to be measured with a digital multimeter on either AC or DC voltage.

Safety features include auto shutoff in the event of a mains interruption or thermal cutout of the cooling fan plus battery isolation via internal contactors.

The load bank is force cooled by a mains 240V powered fans and is supplied with a carrying handles and swivel castors for easy movement.

## **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. Heavy duty lifting handles are provided on each side of the load bank and provides assistance when wheeling the load bank.
3. 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.
4. 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.
5. When in use the load bank should be cordoned off using safety barriers.
6. The load bank should only be operated in an area with adequate ventilation.
7. Do not insert or remove the power cable plug with the load circuit energised.
8. Care should be taken as to the exhaust air outlet that may 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 or power supply connections.
12. Refer to 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

## CONNECTION PROCEDURE

- A. Ensure the power source to be tested is compatible with the load bank operating voltage.
- B. Do not attempt to operate the load bank above the maximum operating voltage.
- C. When testing batteries, check the battery is isolated from the rectifier or charger system.
- D. Check all load bank switches are in the OFF position.
- E. Check the mains supply switch is in the OFF position.
- F. Ensure the power cables are correctly insulated to prevent any possibility of electric shock.
- G. Connect the power cable to the power source under test, ensuring the correct polarity on DC loads.
- H. Insert the power cables into the socket on the load bank.
- I. DO NOT insert the power cable plug with the load circuit energised.
- J. On DC tests, check the polarity is correct.
- K. If required, insert a digital multimeter ( AC or DC volts range, to suit the power source ) into the voltage test sockets on the load bank panel.
- L. If required, insert a digital multimeter (AC mV or DC mV range) into the shunt test sockets on the load bank panel
- M. Connect the load bank to a suitable 240V mains supply.

## OPERATING INSTRUCTIONS

Operators should read the **SAFETY CONSIDERATIONS** and **CONNECTION PROCEDURE** before carrying out the following operating instructions

- 1. Ensure all switches are in the OFF position.
- 2. Turn on the mains switch ON to operate the fan.
- 3. Press the black START push button.
- 4. Select the appropriate load switches to obtain the required discharge current.
- 5. Do not exceed the maximum rating of the load bank.
- 6. The load bank can be used to perform a constant current battery discharge test by manual selection of the load channels as the battery voltage falls.
- 7. At the end of the test, switch OFF all the load switches.
- 8. Disconnect the load bank from the test power source by pressing the red STOP push button.
- 9. DO NOT remove the load power cable socket with the load circuit energised.
- 10. Also at the end of a test the mains supply switch should be left on and the fan running for a few minutes until the resistors have cooled.

**SPECIFICATION**

Type ref	HLB140-230
Nominal operating voltage	120V AC or DC
Max operating voltage	140V AC or DC
Max current rating	240A at 140V AC or DC
Resistor tolerance	+/-5%
Min load step	1 amp at 140V
Max watts rating	32200W
Auxiliary mains supply	240V single phase 50 Hz
Mains input fuse	2 amp
Voltage sockets	direct voltage AC or DC
Shunt sockets	1mV = 4 amps AC or DC
Case size	900mm long , 500mm wide, 750mm high
weight	64 kgs

**TYPICAL PERFORMANCE TABLE****110 VOLT BATTERY TESTS**

HLB140-230 Approximate available current at different test voltages						
Channel	97V	99V	110V	125V	130V	140V
1	0.6A	0.6A	0.6A	0.7A	0.7A	0.8A
2	1.3A	1.3A	1.5A	1.7A	1.8A	1.9A
3	2.7A	2.8A	3.1A	3.5A	3.6A	3.9A
4	4A	4A	4A	5A	5A	6A
5	9A	9A	10A	12A	12A	13A
6	20A	20A	23A	26A	27A	29A
7	26A	26A	29A	33A	35A	37A
8	50A	50A	56A	64A	66A	71A
9	49A	49A	55A	63A	65A	70A
<b>Total</b>	<b>163A</b>	<b>163A</b>	<b>182A</b>	<b>209A</b>	<b>216A</b>	<b>233A</b>

**24V & 50 VOLT BATTERY TESTS**

HLB140-230 Approximate available current at different test voltages						
Channel	21V	24V	27V	43V	48V	54V
1	0.1A	0.1A	0.2A	0.2A	0.3A	0.3A
2	0.3A	0.3A	0.4A	0.6A	0.7A	0.7A
3	0.6A	0.7A	0.8A	1.2A	1.3A	1.5A
4	1A	1A	1A	2A	2A	2A
5	2A	2A	3A	4A	4A	5A
6	4A	5A	6A	9A	10A	11A
7	6A	6A	7A	11A	13A	14A
8	11A	12A	14A	22A	25A	28A
9	11A	12A	14A	22A	24A	27A
<b>Total</b>	<b>36A</b>	<b>39A</b>	<b>46A</b>	<b>72A</b>	<b>80A</b>	<b>90A</b>

## **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 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.

Check the interconnecting cable connections.

Check the mains switch is in the correct ON position.

Check the fan motor operates.

Check the mains fuse.

Check for air blockage.

Check fan blades are secure to motor shaft.

Note :

The cooling fan includes an internal thermal cutout which will activate if the fan motor overheats. The load bank incorporates an automatic current detector which senses the fan motor current and disconnects all load contactors when the fan motor current falls to zero.

The thermal cutout will auto re-set when the fan motor cools.

The load circuits will require re-activation by pressing the START push button.

### **LOAD BANK DOES NOT PROVIDE SUFFICIENT LOAD CURRENT**

Check the power source is at the required voltage.

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 any power source before removing any covers. Testing the load bank with the covers removed is not recommended as high voltages can be present on power resistors or terminals. Repair or replacement should be carried out by the manufacturer.**