POWER QUALITY & LOAD

2.5 MW AUTOMATIC RESISTIVE LOAD BANK

PLC + HMI controlled industrial resistive load bank with automatic testing, live measurement, data logging and safety interlocks.

MODEL VBNKRB2.5MW



CONTAINERISED RESISTIVE LOAD BANK | THREE-QUARTER VIEW

2500 kW / 2.5 MW	415 V AC	PLC + HMI	MODBUS + ETHERNET
RATED CAPACITY	3 PHASE, 4 WIRE	CONTROL SYSTEM	COMMUNICATION

ENGINEERED FOR RELIABLE POWER.

Designed for controlled testing of DG sets, UPS systems, transformers, alternators and other AC power sources.

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Technical specification

Key electrical, control, cooling and construction details of the load bank.

Product type	Automatic Resistive Load Bank
Rated capacity	2500 kW / 2.5 MW at unity power factor
Rated supply	415 V AC, 3 Phase, 4 Wire, 50 Hz
Load control	PLC controlled through HMI touch screen
Load switching	20 independently controlled resistive load stages
Load-step allocation	20 steps; 2776 kW installed provision; 2500 kW operating limit (see page 3)
Power measurement	Modbus power meter with continuous HMI display
Operating modes	Manual, Automatic, Automatic Load Selection, Automatic Load Sequence, Load Cycling and Endurance Test
Cooling	Forced-air cooling with integrated fans and ventilation louvers
Cooling interlock	Fan is started before load enable and continues after load removal for heater cooling
Safety devices	Emergency Stop, air-flow switch, temperature sensor, thermostat, electrical protection and PLC interlocks
Communication	PLC-HMI via Ethernet; power meter via Modbus RTU (RS-485); remote Ethernet monitoring optional
Data logging	Configurable sampling interval: 1 sec, 5 sec, 10 sec, 30 sec or 1 minute
Test report	Automatic test report data with CSV / Excel export and PDF where supported by HMI
Construction	Heavy-duty containerised enclosure with access doors and lifting provisions
Applications	DG sets, UPS systems, transformers, alternators, inverters and other AC power sources

Model	VBNKRB2.5MW
Auxiliary supply	415 V AC, 3 Phase, 50 Hz
Overall dimensions (L x D x H)	5.8 m x 2.3 m x 2.3 m
Approximate weight	6 tonnes (6000 kg)

2500 kW rated resistive load at 415 V AC.

20 selectable resistive load steps

Fine load selection with a nominal 1 kW minimum step at 415 V AC.

2500 kW

RATED OPERATING LOAD

2776 kW

INSTALLED STEP TOTAL

20

SELECTABLE STAGES

STEP RATING	QUANTITY	STAGE NUMBERS	GROUP TOTAL
1 kW	2	1 - 2	2 kW
2 kW	2	3 - 4	4 kW
5 kW	2	5 - 6	10 kW
10 kW	2	7 - 8	20 kW
20 kW	2	9 - 10	40 kW
50 kW	2	11 - 12	100 kW
100 kW	2	13 - 14	200 kW
200 kW	2	15 - 16	400 kW
500 kW	4	17 - 20	2000 kW
TOTAL INSTALLED PROVISION		**20 stages**	**2776 kW**

EXACT STEP SEQUENCE (kW)

1, 1, 2, 2, 5, 5, 10, 10, 20, 20, 50, 50, 100, 100, 200, 200, 500, 500, 500, 500

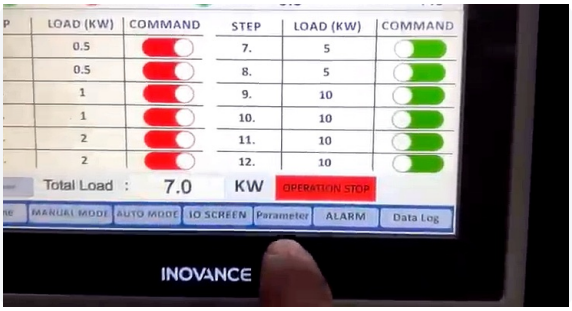
RATING & CONTROL COORDINATION

Step values are specified as resistive kW at unity power factor and rated voltage.
The 2776 kW installed total is step provision, not the simultaneous operating rating.
PLC load selection must restrict combinations to 2500 kW and rated electrical limits.
Example at full rated load: (4 x 500) + (2 x 200) + 100 = 2500 kW.
All manual and automatic modes remain subject to cooling and safety interlocks.

Manual & automatic operating modes

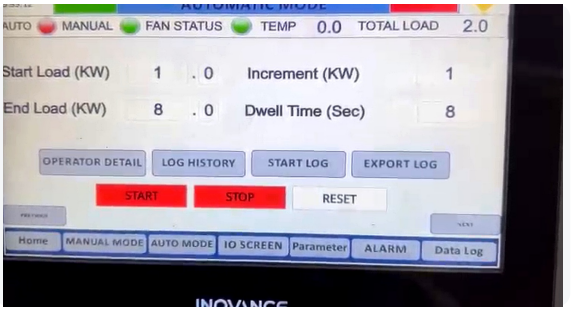
The PLC and HMI provide both direct operator control and programmable automatic testing.

MANUAL MODE



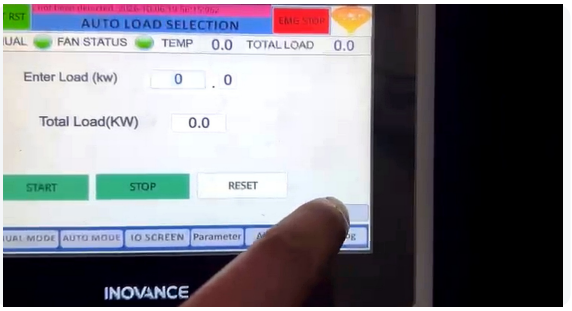
- Start fan and start test from HMI.
- Turn ON/OFF any individual load step.
- Observe live electrical parameters and applied load.
- Save test report.
- No automatic load sequence in Manual Mode.

AUTOMATIC MODE



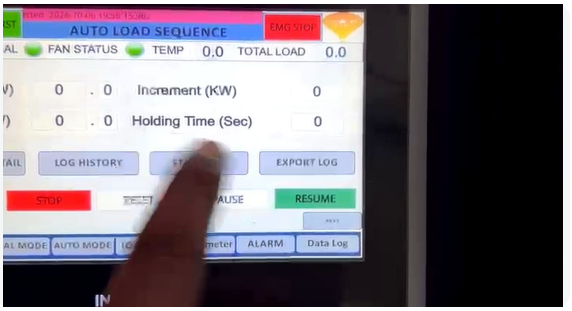
- Enter Start Load, End Load, Load Increment and Dwell Time.
- PLC automatically applies the load according to the entered settings.
- Automatic load increase, hold and unloading sequence.
- Start / Stop / Pause / Resume controls as provided on HMI.

AUTOMATIC LOAD SELECTION



- Enter the desired load value only.
- PLC determines the nearest possible load combination automatically.
- Logic minimizes contactor operation, maintains a balanced sequence and avoids unnecessary duplicate switching.

AUTOMATIC LOAD SEQUENCE

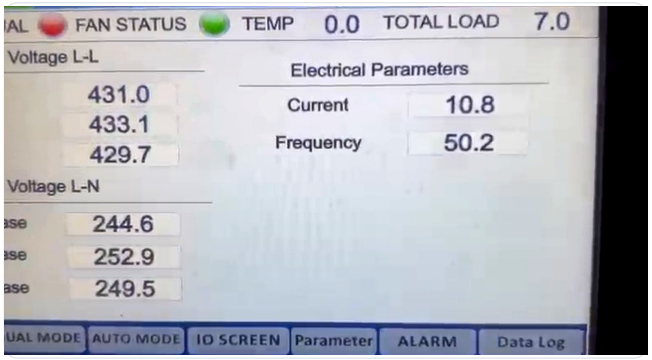


- Enter Starting Load, Ending Load, Increment and Holding Time.
- PLC steps through the programmed load profile automatically.
- Sequence stops after completing the programmed test.

Load cycling, endurance, measurement & reporting

Programmable tests support repeatable factory acceptance, commissioning and endurance trials.





LOAD CYCLING TEST

- Set required Load, ON Time, OFF Time and Number of Cycles.
- PLC repeats the ON/OFF cycle automatically until the programmed cycle count is completed.
- Cycle status and elapsed information are displayed on the HMI.

ENDURANCE TEST

- Enter Required Load and Test Duration.
- PLC maintains the selected load continuously for the test duration.
- HMI displays Elapsed Time and Remaining Time.
- Test data is available for report generation after completion.

FAN / COOLING SEQUENCE

START TEST → FAN ON → WAIT 5 SEC → ENABLE LOAD → STOP TEST → LOAD OFF → COOL 60 SEC → FAN OFF

ELECTRICAL MEASUREMENTS

- Voltage L-L
- Voltage L-N
- Current
- Frequency
- Active Power
- Apparent Power
- Reactive Power
- Power Factor
- Energy / kWh

DATA LOGGING

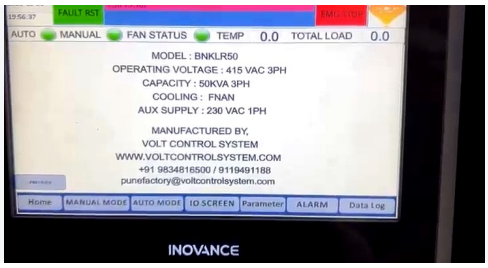
- Date
- Time
- Test Name
- Operator Name
- Voltage / Current
- Frequency / Power / PF
- Selected Load
- Temperature
- Alarm Status

TEST REPORT

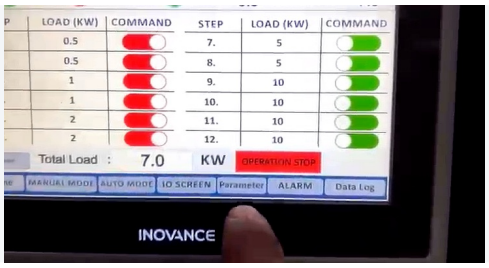
- Customer Name
- Project Name
- Serial Number
- Operator
- Start / End Time
- Duration
- Maximum Temperature
- Electrical values
- Load Applied / Result

HMI interface

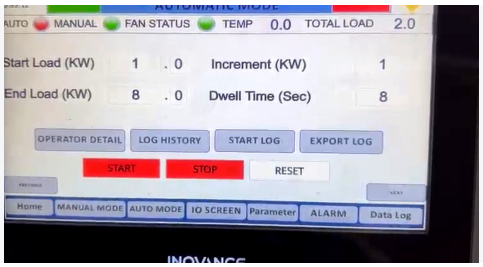
Reference HMI screens illustrate the operating functions and interface.
Displayed ratings and values are from the 50 kVA unit; 2.5 MW settings are unit-specific.



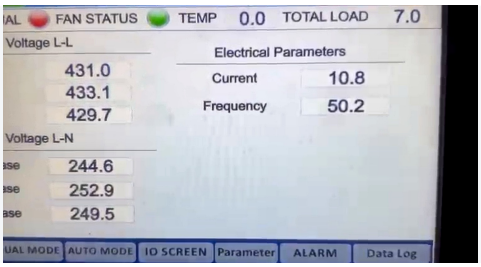
1. SYSTEM INFORMATION



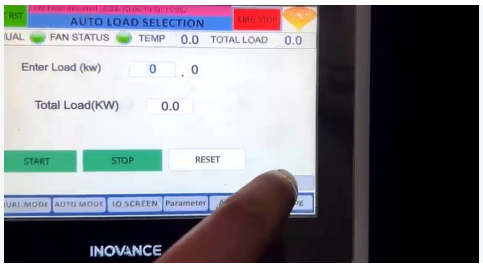
2. MANUAL MODE



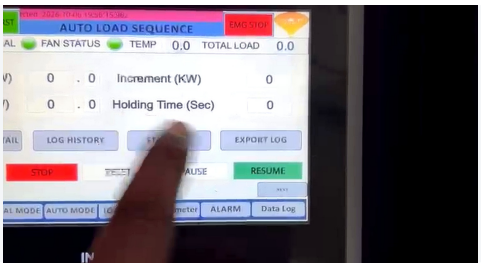
3. AUTOMATIC MODE



4. ELECTRICAL PARAMETERS



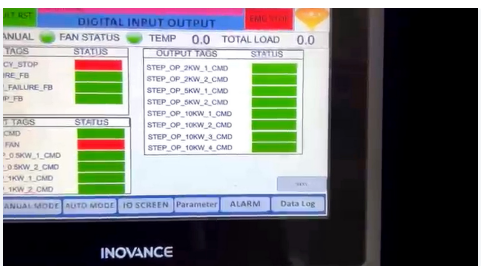
5. AUTOMATIC LOAD SELECTION



6. AUTOMATIC LOAD SEQUENCE



7. LOAD CYCLE TEST



8. DIGITAL I/O STATUS

Safety, alarms, settings & product views

Safety conditions override load commands and are displayed through the alarm and status system.

IMMEDIATE LOAD OFF

- Emergency Stop
- Fan Failure
- Air Flow Failure
- Over Temperature
- PLC Fault
- MCCB Trip
- Modbus Failure

WARNINGS / HISTORY

- High Temperature
- Door Open
- Low Voltage
- Communication Error
- Alarm list with Date, Time, Reset and History

PASSWORD-PROTECTED SETTINGS

- Fan Delay
- Temperature Limit
- Communication Settings
- Date & Time
- Operator Settings

COMMUNICATION

- PLC <-> HMI: Ethernet
- PLC <-> Power Meter: Modbus RTU (RS-485)
- Remote Monitoring: Ethernet TCP/IP (optional)
- Modbus TCP where configured



FRONT ELEVATION



REAR VIEW

VOLT CONTROL SYSTEM

ENGINEERED FOR RELIABLE POWER.

Customized power-conditioning, conversion and load-testing solutions for industrial applications.

CONTACT / ENQUIRIES

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Containerised construction

2.5 MW capacity | 5.8 m length x 2.3 m depth x 2.3 m height | Approx. 6 tonnes



SIDE ELEVATION



CONTROL PANEL VIEW

Integrated control panel

PLC + HMI touch-screen operation

Digital electrical measurement

Supply and load status indications

Emergency Stop pushbutton

Load ON / OFF controls

Main circuit breaker

Control and auxiliary protection

VOLT CONTROL SYSTEM

Office: Unit 06, Electronics Sadan - 01, MIDC, Bhosari, Pune - 411026.

Factory: Units 07, 17, 18 & 21, Electronics Sadan - 01; Unit 03, Electronics Sadan - 02, MIDC, Bhosari, Pune - 411026. | www.voltcontrolsystem.com