JTP POWER

6000 Series
JTP-6040 Data Sheet

415V 3 Phase 50Hz 4MW Outdoor, Containerised, Remote Operated, Resistive Load Bank

Load Steps	1, 2, 2, 5, 10, 10, 20, 50, 100, 19 x 200kW
Load Tolerance	±5% each step ±3% overall
Noise Level	90 dBA at 1m
Dimensions (L×W×H)	6058 x 2438 x 2591 mm
Weight	8500kgs
Rated Ambient Temp / Humidity	-20℃ ～ +50℃ ≤95% RH, non-condensing

Overview

The JTP-6040 load bank is designed to allow a generator or other electrical equipment such as a UPS to be tested continuously at 4000kW and a power factor of 1.0pu, without utilising the normal operating load. It is intended to be installed outdoors and is built into a shipping container for robustness and transportability.

It can be operated in a manual test mode, either using the load step selectors on the internal control panel, or remotely with a cable connected manual remote-control unit.

Additionally, the load bank can be controlled remotely from a PC connected with a RS485 cable, which allows for both manual control and pre-programmed automatic testing cycles, data logging, and the control of multiple parallel connected load banks.

A power meter installed in the local control panel and a display in the remote-control unit show three-phase voltage, current, active power, reactive power, apparent power, power factor, and frequency of the load to an accuracy class of 0.5, with the same information displayed on the PC screen when in use.

Operation

The user can select the control mode as local, remote or PC mode with a selector switch on the local control panel. Only one mode can be active at a time.

In both local and remote mode, the load bank is controlled manually by selecting the required load and then pressing the master load button. This allows the load to be changed with a single button press without intermediate steps.

PC Software

Software is provided for installation on the customer's PC. The software allows the intelligent control of the load bank via a RS485 cable and USB adaptor, along with data logging and reporting.

The software allows 2 control methods, manual or automatic loading. In manual mode the user selects the required load which is then set continuously. In automatic mode the user sets the power and time profile for a full test cycle which is then run automatically.

Multiple load banks can be controlled and monitored either individually or as a single load group from the PC by connecting them in a daisy chain configuration with RS485 cables. Any abnormal operating condition is highlighted on the software control screen.

The software displays the load characteristics in 2s intervals as both absolute values and in graph form. Data is saved in the software and can be queried either during or after testing. Test data can be exported in a spreadsheet and graphs can be exported as .jpg files.

Resistor Elements

The resistors are U shaped sheathed, finned elements that utilise a nickel-chromium alloy (NiCr6023) wire in a magnesium oxide powder that provides good thermal and insulation properties.

The outer stainless-steel sheath makes the elements waterproof and prevents corrosion, protecting the elements from moisture and atmospheric conditions.

The outer sheath is not live, which, along with bracing at both ends of the element, protects against short circuits between adjacent elements. All elements undergo a PFWV test at 2.5kV 50Hz for 1 minute.

The resistor elements are designed to reach no more than 1/3 of the maximum wire operating temperature which ensures a long operating life whilst limiting the change in resistance (±2%), and therefore maintaining a constant load value across the operating profile. The manufacturing tolerance ensures all loads are within ±3% at rated voltage.

Auxiliary Supply

A selector switch allows the 415V 50Hz 3ph auxiliary supply for the fans and the control system to be derived either from the test load or from an external supply via an IEC 60309 socket inlet. The fan supply includes built in automatic phase rotation.

Cooling Fans

The cooling system consists of vertically mounted axial flow fans mounted below the resistor elements. with horizontal air inlets and vertical air outlets. The exhaust air measured 1m from the outlet will not exceed 80°C rise above ambient.

The fans are fitted with waterproof motors and corrosion resistant impellers.

Switchgear & Control System

The load steps are switched with Schneider Electric contactors protected by fuses on each step for short circuit protection. Each contactor is fitted with auxiliary contacts to provide status feedback.

An optional Schneider Electric 4 pole circuit breaker can be fitted to allow local isolation of the load bank. The control circuit is protected by an MCB.

The control system utilises a highly reliable Siemens PLC to reduce the number of intermediate relays and timers required and simplify manufacture and maintenance.

Protection

Protection consists of:

- fan / master load interlock to prevent loading without the fans running,
- differential air pressure sensors,
- fan motor overload,
- air temperature sensors,
- over-voltage protection,
- load step fuses for short circuit protection, and
- an emergency stop on the local control panel and in the remote-control unit to dump all load and stop the fans.

Construction

The load bank resistor elements, fans, and control systems are built into a custom designed 20' shipping container. This provides a robust, durable, and transportable solution that is suitable harsh environments including marine, and tropical locations.

The container complies with all relevant standards and is supplied with a CSC Safety Approval Plate. Fixing points are industry standard, allowing for easy transport, and standard ISO lifting points are included.

The containers are designed for the industry standard payload, but as the weight of the load bank is a third of the rated payload there is a large safety margin built into the design. Additionally, careful layout of internal components ensures even weight distribution.

Special attention is paid to protecting the container from corrosion. After sand-blasting it is coated with a zinc-rich primer, an epoxy base coat, and the outside is finished with a marine quality polyurethane topcoat with a 120µm thickness. The internal surfaces are finished with a high-temperature paint. The standard external colour is RAL 7035 Light Grey, with custom colour schemes also available.

The walk-in control compartment and the resistor / fan compartment are fully segregated, both thermally and electromagnetically, and waterproofed to prevent water ingress into the control compartment. In remote mode, with the doors closed, the control compartment is IP54 and the resistor / fan compartment is IP20. Air inlets and outlets are fitted with stainless steel mesh. Water ingress into the resistor / fan compartment during operation will drain externally.

Separate compartments for the power cable and communication cable terminations ensure no interference between the two. Power cable termination is to copper bars in the terminal compartment.

Full height doors and side access hatches allow easy inspection and maintenance.

Included Accessories

The following accessories are included with the load bank:

- Remote Control Unit
- 100m Remote Cable
- 100m RS485 Cable
- RS485 / USB Adaptor
- PC Software (PC not included)
- Operating Manual

Options

The following options are available:

- Main load air circuit breaker
- Electrically operated air outlet covers
- Custom external colour scheme