

# LOADTEC

LOAD TECHNOLOGY, INC

POWER TESTING & DATA ACQUISITION SYSTEMS

- ECONOMICAL EXERCISE SYSTEM
  - NFPA 70, 99 & 100 CODE EXERCISE
  - ENGINE RADIATOR FAN COOLED
  - QUICK INSTALLATION
  - CUSTOM CONSTRUCTION TO MATCH RADIATOR
  - RADIATOR MOUNTING ADAPTER FLANGE
  - EXHAUST PLENUM ATTACHMENT FLANGE
  - PAINTED TO MATCH ENGINE COLOR
  - OVERHEAD LIFTING PROVISIONS
  - NEMA/OSHA EXHAUST GUARDS
  - FUSED LOAD SECTIONS
  - RESISTAR<sup>®</sup> CONTINUOUSLY SUPPORTED RESISTOR
- NO COOL DOWN REQUIRED & A 3YR. WARRANTY**

LOAD BANK TYPE

**PERMANENT  
RADIATOR MOUNTED  
10-1000KW  
MODEL: ODSR**



**APPLICATION:** This model provides an economical means of meeting NFPA 70, National Electrical Code Standard, Article 700-4 for the exercising of standby/emergency generator sets. It utilizes the engine radiator fan to cool the exercise load with the radiator's exhaust plenum evacuating the rejected heat. A unit sized for the "maximum anticipated load" of the facility will provide an optimum maintenance load in accordance with NFPA 70. It also fulfills the exercising requirements of NFPA 99 & 100.

**INSTALLATION:** It is easily installed on the exhaust side of the radiator. Alternate installation can be integrated into the actual exhaust plenum ductwork. The unit is dimensionally matched to the radiator core and provided with a mounting flange that bolts to the radiator. The unit is installed & cabled by the generator set packager providing a complete system without costly site construction requirements.

**OPERATION:** The Programmable Digital Controller provides a complete generator operational support system. The controller is programmable for start-up base loading for load acquisition support, automatic loading / regenerative operation for light and variable loading applications, automatic exercise with alarm monitoring and basic manual control functions for installation commissioning.

**CONSTRUCTION:** The unit is designed and constructed for long, reliable life in industrial environments. The unit is constructed of galvanized steel that is primed & painted. The enclosure meets U.L. & Nema construction standards and is standardly provided with radiator attachment flanges, overhead lifting provisions, protective screen guard, exhaust plenum attachment flange, structural base mounting provisions and hinged door for connection & control compartment, and multiple control panel orientations to meet the installation requirements.

**RESISTAR<sup>®</sup> LOAD RESISTOR:** The RESISTAR<sup>®</sup> is designed specifically for high density applications. The resistor is continuously supported to minimize shorting contact with surrounding resistors. The resistors are terminated and supported with ceramic components (No plastic or polyester glass laminates are used). The RESISTAR<sup>®</sup> does not require a cool down and has a standard 3 year warranty.

**PROTECTIVE CIRCUITS:** The unit is protected with fusing for each load section and control circuit. It is also provided with a temperature sensor to disconnect the load bank on an over temperature condition. The unit's cooling air flow is inherently present whenever the engine is running and generating a power output.

## ➤ GENERAL SPECIFICATION

**LOAD RATING:** UP TO 1000KW  
**% OF GENERATOR:** Absolute Maximum - UP to 100%  
 Recommended Maximum - UP TO 80%  
**VOLTAGE:** all 50 & 60 Hz. Voltages to 600V  
**STEP RESOLUTION:** 25% minimum, up to 10%  
**TOLERANCES:** ±5% overall, ±2% Ø-Ø  
**TEMPERATURE RISE:** 50° F ΔT Typical  
**AMBIENT:** -20° F - 50° F  
**CONTROL:** PDC Digital Control System  
 Programmable Digital Controller  
**METERING:** Integrated into PDC Digital Controller  
 VM: Average & Ø-Ø, 1V Resolution  
 AM: Average & Ø-Ø, 1A Resolution  
 FM: 45-65 Hz., 0.1 Hz. Resolution  
 KW: Load Bank & Generator, 1KW Res.  
**COOLING:** Forced Air by Engine Radiator Fan  
 1500 FPM Typical Flow  
**CONTROLLER POWER:** 12-36VDC Starting Batteries  
**LOAD RESISTORS:** RESISTAR® Power Resistor  
 No Cool Down required  
**PROTECTION:** Fused: Load & Control Circuits  
 Temperature: Resistor & Control Section  
 Voltage: Voltage Range – Max & Min  
 Frequency: Frequency Range – Max & Min  
**POWER CONTROLS:** Electrically Held Contactors w/ Fuses  
**WARRANTY:** (1)YR Basic, (3)YR Resistors & Electronics

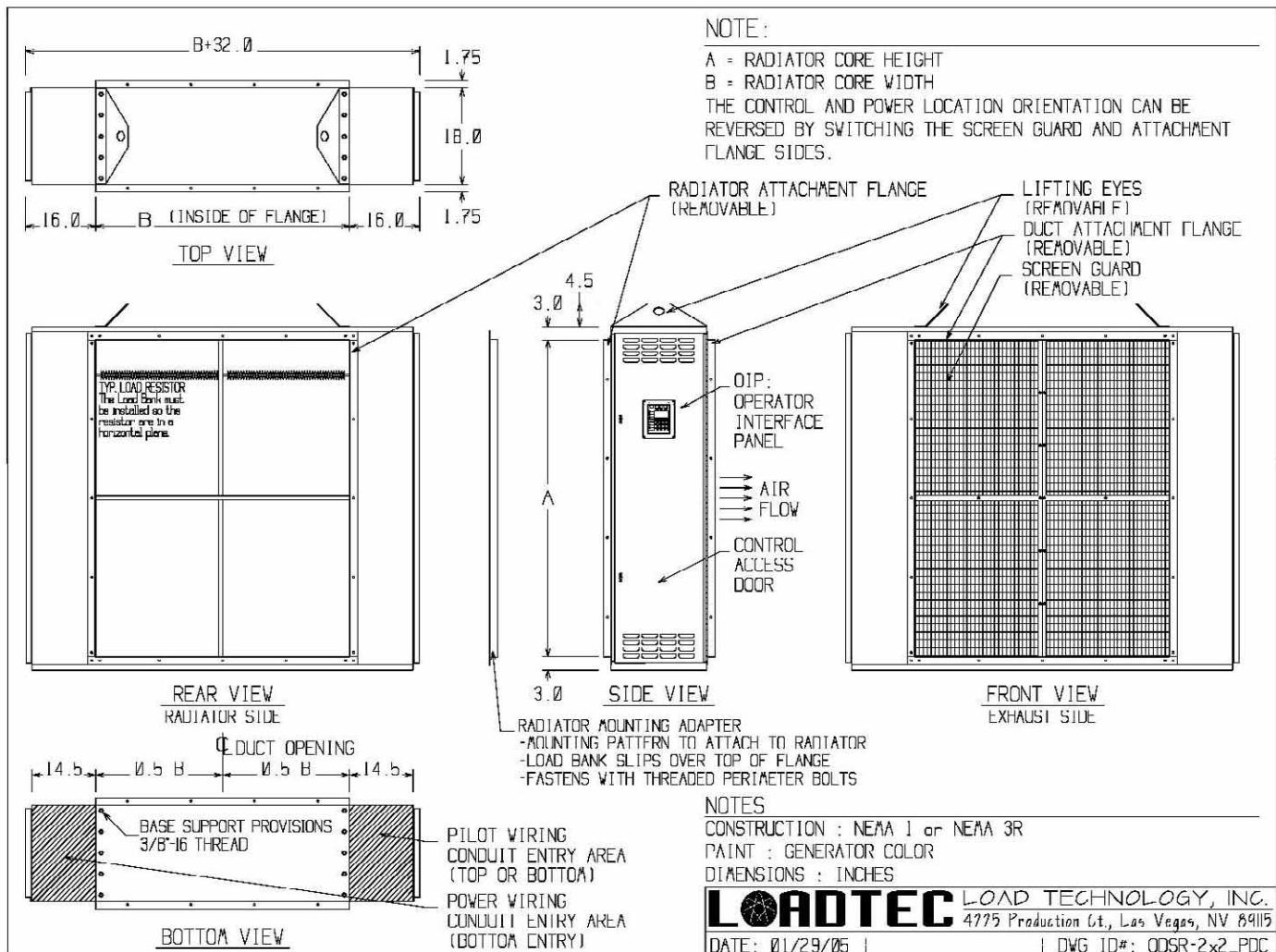
## ➤ TYPICAL OPTIONS

**REMOTE CONTROLLER:** Wall Mounted Controller  
**ADDITIONAL CONTROLLERS:** up to a total of (4)OIP Panels  
**MODBUS:** ModBus control interface  
**TCP/IP:** TCP/IP network control interface  
**WEATHERPROOFING:** Exhaust opening louver panel  
**DEFLECTOR:** Vertical Exhaust deflector  
**SOUND:** Sound attenuating exhaust cover  
**WARRANTY:** Extended Materials and Labor up to 5 Yrs.

## ➤ APPLICATION DATA

**SIZING:** The primary reason to include a Load Bank is to exercise and support the generator operation based on the sites specific requirement. A 60-80% Load Bank is typically more than adequate. NFPA 70, NEC code requires testing on the EPSS at anticipated connected load on a schedule. Typically a generator is not sized at smaller than 80% of the anticipated connected load. We do not recommend a 100% rated Radiator Mounted unit since the site has already been performance proven at original acceptance by external Load Banks to prove 100% performance. After proving the installation, the primary use of the Load Bank is to provide a tool for maintenance and operational support loading. There is no practical reason to test at 100% for routine exercising.

† Designates Optional Equipment or Feature  
 \* Information Subject to Change without Notice



## GENERAL

- The Load Bank is designed for installations to utilize the generators radiator fan for cooling.
- The Load Bank imposes approximately a static pressure load of 0.075-0.100" W.C. on the radiator's fan.
- The installed ambient must not exceed the stated values specified in the Technical Description Sheet.

## PHYSICAL INSTALLATION

### • RADIATOR MOUNTING (OPEN GENERATOR)

- The Load Bank is designed to match the radiator. The radiator's dimensional information provided at the time of order entry is used to design the unit to match the physical dimensions and attachment methods to the radiator.
- When the radiator is equipped with an attachment flange that is perpendicular to the face of the radiator, the Load Bank enclosure is provided with a matching perpendicular flange that slides over the flange on the radiator. The flange on the Load Bank is then fastened to the radiator flange through the holes provided on the Load Bank flange.
- When the radiator is equipped with a face surface hole pattern or a drillable surface area, the Load Bank enclosure is provided with a flange frame that attaches to the radiator. This flange frame creates a perpendicular flange on the radiator. The Load Bank's matching perpendicular flange then slides over the flange frame on the radiator. The flange on the Load Bank is then fastened to the radiator flange frame with the provided hardware.
- Depending on the weight of the Load Bank and the structural capability of the radiator mounting surface, the Load Bank may need additional support. The Load Bank enclosure is provided with base support provisions as detailed on the Elevation drawing. These structural threaded inserts can be used to attach bracketing that would provide additional support from the radiator mounting structure or the grade surface.
- The Load Bank enclosure is also equipped with a perpendicular attachment flange on the exhaust side. This flange is provided as an attachment surface for the duct work to exhaust the heated air from the radiator and Load Bank exterior of the generator room.
- The exhaust flange on the Load Bank must be used to seal the transition from the Load Bank to the exterior duct work. The hot exhaust air must not be allowed to re-circulate back through the radiator cooling fan. The generator's cooling fan creates a negative pressure in the installed area, any opening in the exhaust ductwork will provide a forced re-circulation emphasized by the positive pressure of the exhaust duct work.

### • GENERATOR ENCLOSURE MOUNTING (EXTERIOR SURFACE)

- The Load Bank is designed with a weatherproof enclosure to be mounted to the radiator exhaust opening of the generator enclosure. The radiator's dimensional information provided at the time of order entry was used to design the unit to match the physical dimensions and attachment methods of the enclosure.
- The radiator exhaust opening provided in the enclosure should be the same size as the radiator core size. Enlargement of the opening will cause low air flows at the perimeter and lower air velocities over the entire Load Bank area. This will seriously affect the cooling performance of the Load Bank and could cause overheating failure.
- The radiator mounted inside of the enclosure must also be sealed exhaust duct work to the enclosure exterior to eliminate re-circulation around the radiator. Re-circulation around the radiator will reduce the cooling air flow through the Load Bank.
- The generator enclosure should be provided a face surface hole pattern or a drillable surface area for attachment of the Load Bank. The Load Bank enclosure is provided with a flange frame that attaches to the enclosure surface. This flange frame creates a perpendicular flange on the enclosure. The Load Bank's matching perpendicular flange then slides over the flange frame on the enclosure. The flange on the Load Bank is then fastened to the radiator flange frame with the provided hardware.
- Depending on the weight of the Load Bank and the structural capability of the enclosure's mounting surface, the Load Bank may need additional support. The Load Bank enclosure is provided with base support provisions as detailed on the Elevation drawing. These structural threaded inserts can be used to attach bracketing that would provide additional support from the enclosure base or the grade surface.

• **GENERATOR ENCLOSURE MOUNTING (INTERIOR)**

- Installation of the Load Bank inside of a compact modular generator enclosure is similar to installation previously described in the "RADIATOR MOUNTING (OPEN GENERATOR)" section with a few additional considerations.
- Follow the instruction for the installation of the Load Bank enclosure to the radiator detailed in the previous "RADIATOR MOUNTING (OPEN GENERATOR)" section.
- The exhaust flange on the Load Bank must be used to seal the exhaust of the Load Bank to the exterior of the enclosure. The hot exhaust air must not be allowed to re-circulate back through the radiator cooling fan. The generator's cooling fan creates a negative pressure inside of the enclosure and any opening in the exhaust ductwork will provide a forced re-circulation emphasized by the positive pressure of the exhaust duct work.
- These compact style enclosures provided minimal interior clearances, but minimum clearances must be maintain to assure proper Load Bank operation.
- The ambient air in the front corners of the generator enclosure may be stagnant causing the radiant heat of the radiator and the Load Bank to elevate the temperatures above acceptable maximum ambient. Air intake louvers in the generator enclosure should be considered for installation in the area of the Load Bank's power connection and access area. This will provided fresh ambient air when the generator and Load Bank is operating.
- If the generator enclosure can not be provided with fresh are louvers and the interior ambient will exceed the specified maximum, consideration should be given to the installation of an optional ductable control section cooling fan.
- It is recommended that the generator enclosure is equipped with a hinged access to the power connection and access side of the Load Bank enclosure.

**ELECTRICAL CONNECTION**

- The Load Bank electrical connection requirements are detailed by the drawing manual provided.
- The Load Bank will require power connection to the generator power output and, if provided with a remote panel, the control panel will have to be installed and wired to the load enclosure.
- Connect the required power conductors from the generator to the Load Bank's Main Bus connection points as detailed by the supplied drawings for the specific unit. All connections must take in consideration National Electrical Code and any local code requirements concerning, but not limited to, cable sizing, wiring methods, and over current protection.
- Particular attention must be made in properly grounding the Load Bank per National Electrical Code and any local codes.

**WARNING**

**FOR OPERATOR SAFETY**

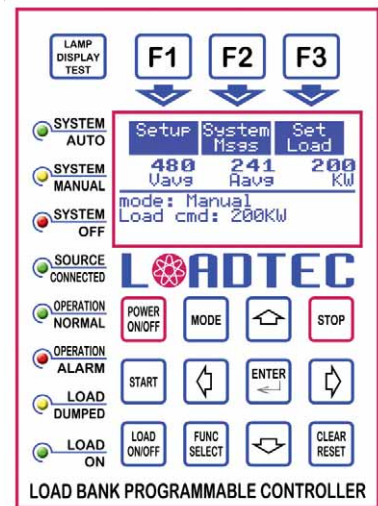
The Load Bank **MUST BE ELECTRICALLY GROUNDED** in accordance with the National Electrical Code & any local codes.

- Control panel connection points as detailed by the supplied drawings for the specific unit. All connections must be made in accordance with the National Electrical Code and any local code requirements concerning, but not limited to, cable sizing, wiring methods, and over correct protection.
- Depending on the control functions provide, certain wiring to external monitoring or control points may be required. If required, these connection should be made as detailed by the supplied drawings for the specific unit. All connections must be made in accordance with the National Electrical Code and any local codes.



# PROGRAMMABLE LOAD BANK CONTROLLER

## DIGITAL CONTROLLER TO MEET THE MOST DEMANDING PROJECT SPECIFICATION



### ▶ PROGRAMMABLE FOR SITE REQUIREMENTS

- ▶ **AUTOMATIC EXERCISE OPERATION:** Real time clock unattended exercise
- ▶ **AUTOMATIC LOADING OPERATION:** maintain a minimum load
- ▶ **BASE LOADING OPERATION:** load the generator before transfer
- ▶ **REGENERATIVE ABSORPTION OPERATION:** absorb regenerative power
- ▶ **MANUAL LOADING OPERATION:** Operator controls to manually load the source
- ▶ **METERING:** Monitor the electrical values and the source loading level

### ▶ DIGITAL COMMUNICATION INTERFACES

- ▶ **INTERCONNECTIONS:** Simple CAT5 cable interface to modules
- ▶ **MULTIPLE CONTROL PANELS†:** up to (4) panels by RS422 connection
- ▶ **EXTERNAL CONTROL†:** Mod-Bus® & other control protocol communications available
- ▶ **TCP/IP INTERFACE†:** Connect to a LAN or WAN and communicate from anywhere

### ▶ AUTOMATIC EXERCISE OPERATION:

- ▶ THE AUTOMATIC EXERCISE FUNCTIONS PROVIDES THE CAPABILITY TO SCHEDULE AN UNATTENDED EXERCISE & LOADING OF THE SOURCE. THE FOLLOWING PARAMETERS ARE PROGRAMMABLE:
  - ▶ ENABLE / DISABLE
  - ▶ TIME OF DAY
  - ▶ DAY INTERVAL/DAY OF WEEK
  - ▶ TEST SEQUENCE: (8) stage
  - ▶ FAILURE TO COMPLETE EXERCISE ALARM
  - ▶ Under/Over VOLT & FREQ. LEVELS TO ALARM

### ▶ BASE LOADING OPERATION:

- ▶ THE BASE LOADING FUNCTION PROVIDES THE CAPABILITY TO PROGRAM THE LOADING OF THE GENRATOR AT STARTING AND BEFORE THE CONNECTION TO THE FACILITY LOADS. THIS PROVIDES ENGINE TURBO BOOST & ALTERNATOR FIELD BOOST TO IMPROVE GENERATOR CONNECTION STABILITY TO MOTOR LOAD AND NON-LINEAR LOADS. THE FOLLOWING PARAMETERS ARE PROGRAMMABLE:
  - ▶ ENABLE / DISABLE
  - ▶ VOLTAGE PERCENTAGE INITIATION
  - ▶ AMOUNT OF LOAD
  - ▶ TIME LOAD IS APPLIED IN SECONDS

### ▶ MANUAL LOADING OPERATION

- ▶ THE MANUAL OPERATION ALLOWS THE OPERATOR TO DIRECTLY APPLY DESIRED LOAD TO THE SOURCE.
  - ▶ SELECT LOAD VALUE
  - ▶ LOAD ON/OFF

### ▶ AUTOMATIC LOADING OPERATION:

- ▶ THE AUTOMATIC LOADING FUNCTION PROVIDES THE CAPABILITY TO PROGRAM A MINIMUM LOADING OF THE SOURCE. THIS REDUCES INEFFICIENT OR UNSTABLE OPERATION OF THE SOURCE. THE FOLLOWING PARAMETERS ARE PROGRAMMABLE:
  - ▶ ENABLE / DISABLE
  - ▶ SOURCE RATING
  - ▶ PERCENTAGE OF LOAD TO MAINTAIN
  - ▶ CURRENT TRANSFORMER SIZE
  - ▶ DELAY PROFILES: INITIAL, LOAD, UNLOAD
  - ▶ LOADING RESOLUTION

### ▶ REGENERATIVE ABSORPTION OPERATION:

- ▶ THE REGENERATIVE ABSORPTION FUNCTION PROVIDES THE CAPABILITY TO ABSORB LOAD REGENERATION FROM SOURCES SUCH AS ELEVATORS TO PREVENT GENERATOR OVERSPEED. THE FOLLOWING PARAMETERS ARE PROGRAMMABLE:
  - ▶ ENABLE / DISABLE
  - ▶ PERCENTAGE OF REGENERATION

### ▶ METERING:

- ▶ METERING IS PROVIDED TO MONITOR THE LOAD BANK AND SOURCE ELECTRICAL VALUES.
  - ▶ General: VM,AM,FM
  - ▶ Load Bank: KW
  - ▶ Source: KW

### ▶ GENERAL:

- ▶ LCD GRAPHIC OPERATOR DISPLAY
- ▶ LED'S FOR BASIC SYSTEM STATUS
- ▶ REAL TIME CLOCK
- ▶ NON-VOLATILE MEMORY: STORES SYSTEM

† Designates Optional Equipment or Feature

Representative:

Load Technology, Inc.  
4225 Production Ct.  
Las Vegas, NV 89115  
[www.loadtec.com](http://www.loadtec.com)

Tel: 800-LOADTEC  
: 702-643-8750  
Fax: 888-LOADTEC  
: 702-643-8751  
[sales@loadtec.com](mailto:sales@loadtec.com)