

LSMC Series SPECIFICATION Marine Load Banks

Design Concept

Sephco® Marine load banks are completely self-contained, free-standing units incorporating a carbon composite, sea water cooled heat exchanger fitted with Sephco® NIC resistors specifically developed to withstand the rigors of seawater operation.

LSMC Load Banks are a product of years of testing and development. The complete package has been developed solely for harsh marine environments

The Load Bank incorporates a marine pump, a control cubicle containing load contactors for each load group, individual load group circuit breakers, load bank protection devices, main load busbar, auxiliary terminals, malfunction detection system and the latest generation Smartload® Automatic generator load controller refined to suit the special requirements of marine applications.

SEPHCO LSMC Load Banks are manufactured to ISO9002 quality assurance and are a product of fifty years of research and development associated with power generation. The LSMC Marine range is manufactured in various ratings and voltages. The standard design concept ensures total reliability and performance for trouble free operation.

Heat Exchanger

Carbon fibre composite construction, vacuum moulded. Incorporating copper nickel fittings and silicone hump couplings to inlet and discharge ports. The design provides for easy access to the resistors. The unit has been tested to operating temperatures of 140°C.

Cooling

The resistor banks are cooled by pumping fresh seawater through the exchanger with a marine quality pump. The pump is pre-wired into the system and protected by a motor overload. Interlocks and monitoring devices are incorporated into the assembly to protect the system from pump failure, over temperature, over pressure, insufficient water flow and air locks



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Limited space and system flexibility

The system is designed to provide for situations where space is at a premium.

The package is designed for left or right hand installation. For restricted areas, the control enclosure can be moved to a suitable location. Additionally the complete gear plate can be removed and located within a main switchboard. If required, the pump can also be relocated. The wiring and plumbing simply needs to be extended.

The unit can be removed from its base if the location has restrictions.

The carbon unit can also be mounted vertically if necessary.

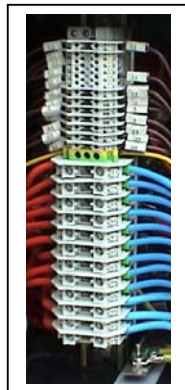


Switchgear



Switchgear is segregated in groups and arranged in a modular fashion. Resistor groups are switched by contactors and protected by a re-settable circuit breaker so any loss of a component can simply be isolated by its circuit breaker.

Cable Connections



The control enclosure has main busbars for generator connection. Cable entry is at the side or bottom of the enclosure. The other connections required are to the current transformers on the main busbar, optional external enable / disable and interface with vessel management system and generators. All terminals are numbered for ease of connection

Conduits and External wiring

All electrical connections between components of the system are cabled in low fire hazard rated, Polyamide (Nylon) 6 flexible DIN5510 conduit. UL, IP67, Lloyd's approved.



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Control System

The control system is a dedicated microprocessor designed to carry out power measurements, calculations, monitor load bank safety devices and control of applied loads. The system can manage several generators. The generators can be of different sizes. The Smartload®LSM800D control is located in the control cabinet . Status can be monitored through a Lexan® window.



Resistors

Load resistors are fully sealed SEPHCO® type NIC alloy sheath, treated to minimise galvanic action. Constructed to IP 67, fitted with copper nickel bushes. The NIC alloy used has been selected as a result of testing in real time for thousands of hours in heated salt water. Resistors are calibrated to within 2.5% of their rated value and tested to 2kV. Resistor connections are in light gauge nickel-plated copper busbars, arranged to minimize strain on resistor terminals. All connections of resistor groups are made using 105° C rated multi-stranded flexible cable.

Cooling Pump

High quality marine specification self-priming pump with stainless steel shaft, zinc free Admiralty bronze impeller and housing. Fitted with a WEG motor . IP 56 rated, protected by thermal overloads and circuit breaker.



Safety Interlocks

The LSMC Load banks incorporate the SEPHCO® Interlock system which protects against pump failure, insufficient flow, over temperature, over pressure and airlocks.

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SYSTEM CONNECTIONS CABLE ACCESS

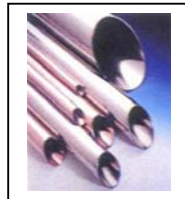


Hydraulic Connections:

Inlet: Cool seawater supply from sea chest.
Outlet: Discharge to Overboard.
Drain: Discharge to Bilge Tank.



Plumbing & Fittings



All fittings are selected for a marine environment. Pipe, pipe fittings, bushes, and valves are copper-nickel 90/10.

Applicable standards: DIN CuNi10Fe1.6Mn
ASTM C70600
MIL-T-16420K

Cool-down

A cool down period of five minutes is automatically activated on load and pump shut-down and on tripping of the interlock protection system.

Switchgear and Auxiliaries

All load groups are evenly balanced and switched by suitably rated mechanical contactors. Each load group is protected by a re-settable circuit breaker.

Anti Corrosion and Finish

All metal panels are pre-treated prior to fabrication with a hot zinc coating process. Final painting and finish utilizes a triple coat of two pack polyurethane marine enamel supplied by Ameron, Caprithane 579.

The control cabinet, pump and plumbing is finished in Snow White. The vessel is polished natural carbon fibre finish and the base is unpainted marine grade deck plate aluminium.

All screws and bolts are #316 stainless steel. All components have been selected for marine use. The system is assembled to ensure it is sealed and insulated to minimise electrolytic conductivity.



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OPTIONS

A number of options are available with the system.

- Vertical mounting.
- Without factory fitted pump.
- Special paint type and colour
- Multiple generator control.
- Alarm and status outputs.
- Remote Manual Override control panel.



Availability

The units are built in sub assemblies and kept in stock.

Each system is assembled to order at the required voltage, size and configuration.

How To Order

To expedite the order and ensure a correct and smooth installation we request the "Specification Questionnaire" be completed prior to manufacture.

This helps us to ensure the configuration is correct and the controls are set-up for your application.

Completion of the questionnaire further enables us to assist with the appropriate location of the CT's and other hardware details.

Sephco Limited Warranty - General

All Smartload® Banks are covered by 12 months factory warranty including SEPHCO® NIC resistors. Please refer to standard "Conditions of Sale" and Sephco® "Warranty"

Limited Warranty for LSMC Marine Load Banks

The above warranty applies to LSMC Load Banks supplied as a complete package.

The complete package is pre-wired with all protection and control devices connected, tested, programmed and set.

The warranty may be void in the event that the system is separated (i.e. the control cubicle and/or pump is re located or supplied by the client) and not re-connected in accordance with the installation instructions.

The warranty will be void if the flow control, pressure switch, auto air vent, thermostats or interlocks are altered, removed or not reconnected.

The warranty does not cover damage or corrosion caused by electrolytic action.

Galvanic Corrosion.

Sea water contacting different metals or alloys causes galvanic corrosion. Corrosion is generally increased or accelerated by stray electrical current leakage, flowing between the AC earth and the hull DC bonding system.

The LSMC load bank has been designed to minimise these effects.

The best materials have been selected to minimise oxidation potential and galvanic action.

Special attention has been paid to the assembly and components to minimise conductivity.

Due to common grounding the LSMC unit cannot be insulated from current leakage and electrolysis that may exist in other areas of the boat which can cause galvanic action.

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Maintenance

Residue and scale will accumulate as a function of operating hours and water temperature. A service interval of 1000 hours is recommended.

Complete inspection is recommended every 4000 hours or each year.

A plug connection is provided to allow flushing with SEPHCO® de-scaling solution at regular service intervals. Accumulated "Run Time" hours are displayed on the control panel. Failure to maintain regular cleaning procedure will void the Sephco Limited Warranty.

SPECIFICATION summary LSMC LOAD BANKS

Ratings	: Available in 20, 30, 40, 50, 60, 75 and 100kW
Voltage	: Available in 208, 240, 380, 400, 415, 440, and 480Volts
Operating Frequency	: 50 Hz or 60Hz.
Inlet Size	: 32mm hump coupling c/w two 316SS clamps
Outlet Size	: 32mm hump coupling c/w two 316SS clamps
Drain Size	: ½” NPT male
Pump	: 1.1 HP IP 55
Suction Head	: 6.5 Metres
Discharge	: 6.5 Metres
Heat Exchanger	: Carbon fibre composite construction.
Plumbing & Fittings	: Copper-nickel 90/10
Flexible Couplings	: 32mm Reinforced blue silicone Marine SAE J2006.
Drain & isolation Valves	: Copper-Nickel 90/10
Run Hours	: Displayed on LSM800D Control
Control Voltage	: 120V or 240V dependent on model.
Emergency Stop	: External enable/disable switch
LSM800D control voltage	: 12V
Control Type	: Model Smartload® LSM800D digital display
Communication	: Direct Connection - USB socket Vessel Management System Interface: MODBUS RTU protocol. RS485 interface 2 wire signal ground and separate shield connections
Control Resolution	: Dependant on model generally 10kW
Resistors	: Sephco® NIC Alloy immersion type.
Cable Connection	: Through gear plates, multiple cable and location

Hydraulic Connections

Inlet	: From Sea chest
Outlet	: To overboard
Drain	: To bilge tank

LSMC Series Controls

Smartload® LSM800D Automatic Generator Load control



The LSMC Load Bank range is supplied with the LSM800D controller and switch gear. Supplied in a self contained control panel as part of the assembly. The control uses the latest generation CMOS microprocessor with EEPROM memory for system back-up of operation parameters during power loss. Advanced 'C' software programming provides a level of control not possible with any current sensing relays or PLC.

By monitoring the genset current via an appropriate C.T., the unit calculates the exact load required to precisely stabilize the genset loading. The linear hysteresis of the control ensures fast response and conditions the ship's load accordingly by adding an appropriate load value from the load bank to correspond with the controller's set value, generally 65 % of genset rating. Upon recovery of the ship's load, the processor instantly sheds loads from the load bank to maintain the current required.

To set-up the LSM800D is simple. It has been designed to allow the operator to enter the data fields to suit the application. Data Fields to be entered: C.T. ratio, current rating of generator, delay ON time, Delay RESPONSE time and the Load Step values.

Additional Control Functions.

Safety

The LSM800D monitors water temperature, system flow and pressure.

In the event of over temperature a pump cool down period is initiated prior to shut down.

If there is insufficient flow, the Hall sensor flow control will shut down loads and continue to monitor flow. If the flow recovers within the pre set time the unit is reinstated to normal operation.

An over pressure situation will immediately initiate an emergency stop.

The display panel will indicate a fault cause message visible through the window in the door.

Alarms

Voltage free out put to indicate a fault condition.

Display Panel

The display panel has multiple indicating functions

- Elapsed hours.
- % load or kW setting on genset.
- Text messages indicating the type of fault condition and service required.
- Data entry display of setup parameters.

Multiple Generating Sets

Additional inputs are provided to allow for multiple generators. A remote input signal activated as the standby generator comes online initiates the second operating menu option. Further information is provided for the location of the CT's in our technical data. Please consult the factory regarding the design of your system.

Enable/Disable Input

A voltage free input is provided for external control and system interface.

Refer to "System Interface" information.

Communication

Direct Connection

USB socket

Vessel Management System Interface

MODBUS RTU protocol. RS485 interface. 2 wire with signal ground and separate shield.

Refer to detail "System Interface" overview

LSMC Series Controls cont.

Operation and set up

Refer to detailed "Operation" and "Setup" and "Installation" information

Alarms

Voltage free out put to indicate a fault condition.

Data out put signal provides alarm status of:

- Over temperature
- Over pressure
- Low water flow
- Pump overload or failure
- Service required

Monitoring

Data output for vessel management system interface. Output signal provides status indication of:

- System loading
- Water flow rate

Remote Control, Manual Override and Genset Exercising Option LS800MPE



Adding an LS800MPE control panel to the installation in any remote location provides extra flexibility to the system. Connected by a 3 core cable to the accessory terminals on the main control panel of the load bank. Featuring a touch-type keypad and LED display, the LS800MPE offers simple operation for manual controllability of the load bank. Operations include Manual Loading, Auto-Run and Auto Genset Exercise mode. The exercising function is programmable by setting up a load routine with time duration. The LED display indicates the kilowatt value activated at the load bank during the switching operation. Additional LED's display mode selection and the status of the load bank, including cooling fault. Connection for a voltage free signal is provided for interfacing with a external management system, transfer switch or generator start relay. In the event of a power failure occurring during manual operation or auto exercising, the voltage free signal disables the controller, instantly dumping of loads in the load bank and reinstating the "Auto Standby" mode for normal operation.

SEPHCO® LSMC Series Load Banks

Standard Dimensions

Marine Smartload® Models
 Available in 208V, 240V, 380V, 400V, 415V, 440V, 480V
 20Kw – 75Kw

Model	Rating	Load Resolution	Length A	Width B	Height C
LSMC1-20	20Kw	5Kw	1040 mm	565 mm	875 mm
LSMC1-30	30Kw	5Kw	1040 mm	565 mm	875 mm
LSMC1-40	40Kw	10Kw	1040 mm	565 mm	875 mm
LSMC1-50	50Kw	10Kw	1040 mm	565 mm	875 mm
LSMC1-60	60Kw	10Kw	1040 mm	565 mm	875 mm
LSMC2-75	75Kw	12.5Kw	1220 mm	565 mm	875 mm

