BOOK# 091-32-1

INSTRUCTION MANUAL

LOAD MANAGER

A START-UP AND SHUT DOWN LOAD SEQUENCER AND AUTOMATIC LOAD SHEDDING SYSTEM

MODEL #091-32

3 YEAR WARRANTY

KUSSMAUL ELECTRONICS CO., INC.
170 CHERRY AVE., WEST SAYVILLE, N.Y. 11796
TEL: in NY **631-567-0314** TOLL FREE: **800-346-0857** FAX: **631-567-5826**

INTRODUCTION

The LOAD MANAGER is a device which:

1. Sequentially energizes and deenergizes relays at approximately 1/2 second intervals in order to reduce transients in a vehicle's electrical system.

2. Detects when the vehicle's electrical load is greater than the output of the alternator. When this occurs, loads are sequentially deenergized until the alternator output is equal to the load.

The LOAD MANAGER features an input which permits selecting the load shedding feature or operating only as an automatic load sequencer. It is possible to completely override the LOAD MANAGER and operate all relays simultaneously by connecting one input to the vehicle ground. An indicator circuit is included to operate a small LED indicator panel. This provides the vehicle's driver with the information that the LOAD MANAGER is active and loads are being removed from the system.

LOAD MANAGEMENT PROGRAMMING

Recognizing that priorities may change after an installation is made, the LOAD MANAGER is designed so that the sequence of load removal may be easily altered.

At installation, the highest priority load is wired to relay 1 which is operated by terminal 3. (NOTE THAT THE RELAYS ARE NOT PART OF THE "LOAD MANAGER" AND ARE SUPPLIED BY THE INSTALLER) The second highest priority load is wired to relay 2 which is operated by terminal 4. A total of 7 relays, decreasing in priority are operated by terminals 5, 6, 7, 8, & 9. See the schematic of figure 1.

Upon start-up, when the LOAD MANAGER operates as a sequential loading device, the loads are applied in priority order with the highest priority first.

When the LOAD MANAGER feature is enabled and excessive electrical loads cause a drop in battery voltage, the LOAD MANAGER will deenergize loads at approximately 60 second intervals starting with the lowest priority. Loads will be removed until the voltage returns to normal.

After installation the user may vary the priority by altering the switch setting from the BASIC SETTINGS illustrated in figure 2.

CAUTION

There are 5 switches, each with 5 levers. Only one lever on each switch may be in the "ON" position.

Each switch controls the operation of a relay. The actuation sequence of a particular relay is controlled by the individual levers of each switch. Lever #5 is the lowest priority, while lever #1 is the highest. It is thus possible to arrange the relay operating priority for the 5 lowest priority relays.

NOTE

The LOAD MANAGER is designed to operate relays. It is not necessary to connect to all outputs. Any outputs, at the discretion of the installer, may remain unused. Nothing should be connected to the unused outputs. Relays must have a coil resistance of 40 ohms or greater.

DO NOT LOAD ANY OUTPUT WITH A RELAY WITH A RESISTANCE LESS THAN 40 OHMS

APPLICATION NOTES FOR MODEL 091-32 LOD MANAGER

The Load Manager is a control which sequentially energizes and deenergizes 7 relay circuits by connecting the coils of these relays to ground. In addition a voltage sensor senses the vehicle's battery voltage and when this drops below a preset level, the Load Manager will deenergize relays until the sensed voltage has stabilized.

With this general operation in mind the following is a brief discussion of the function of each of the pins.

Pin 1: This is the +12 volt power which energizes the Load Manager. It also is the point at which the vehicle's voltage is sensed. Pin 1 must be connected to a good, solid +12 volt source as close to the battery as practical. Any voltage drop between the battery and the sensing point will appear to the Load Manager as a reduction in battery voltage. This will then cause the Load Manager to shed some loads.

Pin 2: This pin is a manual override of the Load Manager. Grounding Pin 2 will energize all of the relays and bypass the Load Manager. No other inputs are required except the proper connection to the load relays. Ground Pin 2 is an excellent way to verify the relay wiring on installation or to bypass the Load Manager in case of malfunction.

Connection to Pin 2 is not required for Load Manager operation

Pins 3, 4, 5, 6, 7, 8, & 9: These pins connect to the "low" side of the relays. The relay coils must be energized with +12 volts and connection to ground is made through the Load Manager. The installation instructions show that the manual control switch for each relay is wired to the "low" side. This is the usual arrangement. It is not the only configuration that is possible. The individual load switches can be wired to the supply side of the relay. The only requirement is that the Load Manager must be the device that grounds the relay.

Pin 10: This is the ground pin for the Load Manager. Pin 10 is the power and signal ground. It must be connected to a good ground or returned directly to the battery negative. Any voltage drop between the point where Pin 10 is connected and the battery (-) will be sensed as a decrease in battery voltage and will raise the voltage at which the load shedding starts. A good check of an installation us to use a sensitive voltmeter and measure the voltage between Pin 10 and the battery (-) post. This voltage should not exceed .050 volts for all the load relays energized. Note that Pin 10 carries the total current of all the 7 relay coils connected to the Load Manager output. This can be as high as 1 ampere. For a 10 ft. long wire connected to Pin 10 this would require a minimum wire size of #14 AWG.

Pin 11: This is the output to the display. The Load Manager display contains two LED's. One LED, the green one, is illuminated whenever the +12 volts is applied to the display. This indicates that the load management circuit is active. The red LED is illuminated by grounding the yellow wire of the display. This is done by Pin 11 and occurs when the Load Manager senses a low voltage.

Pin 12: This is a +12 volt input which starts the sequential switching of the relays. Applying +12 volts to Pin 12 energizes the relays at approximately 1/2 second intervals. Removing the +12 volts from Pin 12 will sequentially open the relays at approximately 1/2 second intervals. This voltage must be 12 volts or not less than .20 volts below the battery voltage. BEWARE OF LOW VOLTAGE!

Pin 13: This pin is not used and no connection should be made to it.

Pin 14: This pin turns "ON" the voltage sensor in the Load Manager. Applying +12 volts to Pin 14 will make the Load Manager shed loads that cause the voltage at Pin 1 to drop below 11.5 volts (12.3 volts for PIE units). If Pin 14 is not connected, the Load Manager is a simple sequencer. When Pin 14 and Pin 12 are simultaneously supplied with +12 volts the Load Manager will sequence the loads "ON" and sheds excessive loads simultaneously.

ABOUT LOAD SHEDDING

The Load Manager voltage sensing circuit has been designed to react very slowly to drops in voltage. This is necessary to eliminate nuisance shedding due to transients and temporary drops in voltage. The actual response time in any installation can vary widely for two reasons: 1. the number and capacity of the batteries and 2. the amount of current that the loads draw in excess of the alternator output.

Consider two installations. The first with only a single battery and the second with six batteries in parallel. Now, for any given overload, the voltage of the single battery will decrease much more rapidly than the voltage of the six batteries in parallel. Thus the Load Manager will detect the overload sooner with the single battery and start to shed loads.

Similarly for any battery configuration, if the overload, the amount that the load current exceeds the alternator output, is larger, then the battery voltage will drop faster and load shedding will occur sooner.

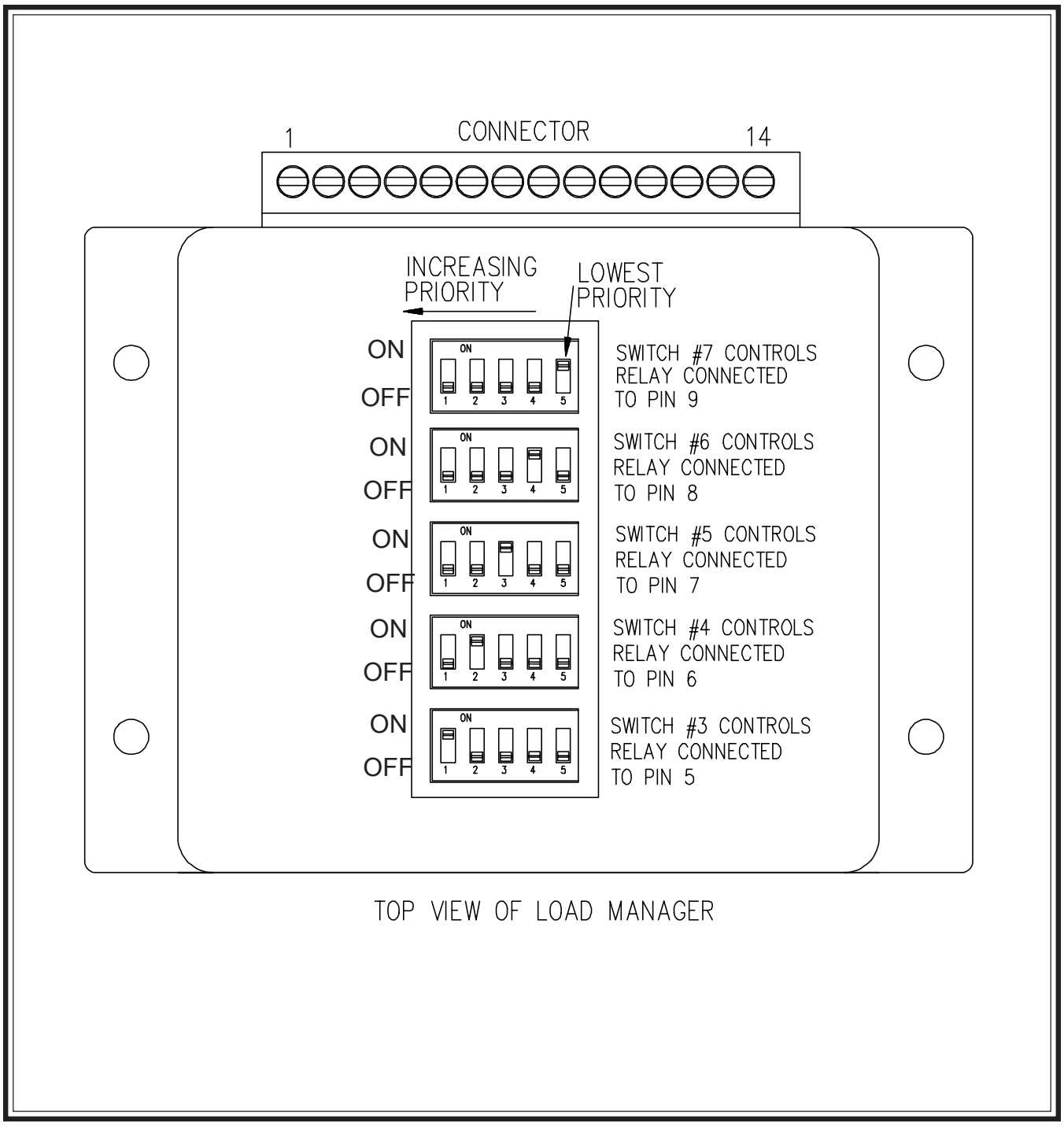

Figure 2, Basic Switch Settings

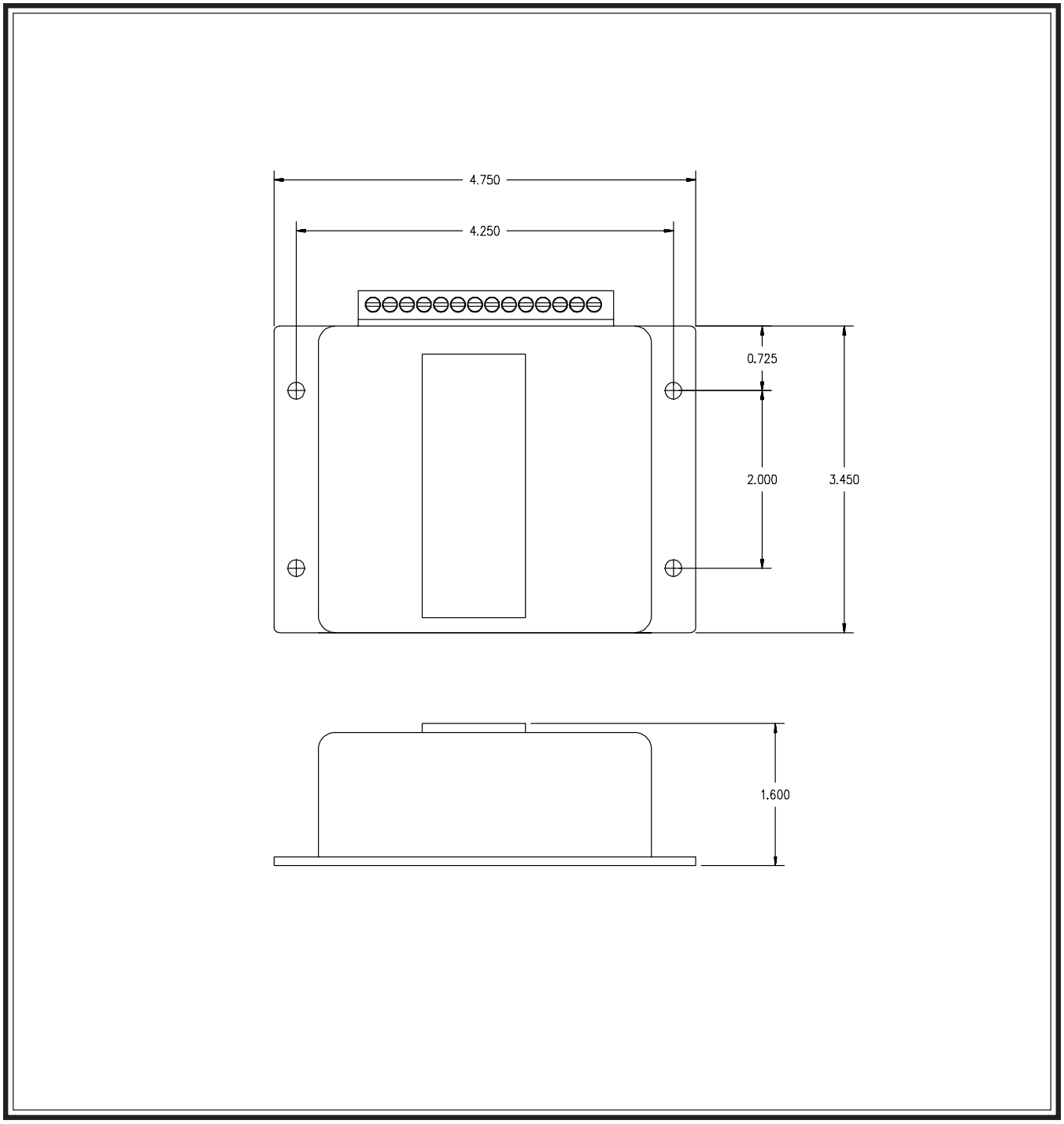

Figure 3, Outline, load Manager

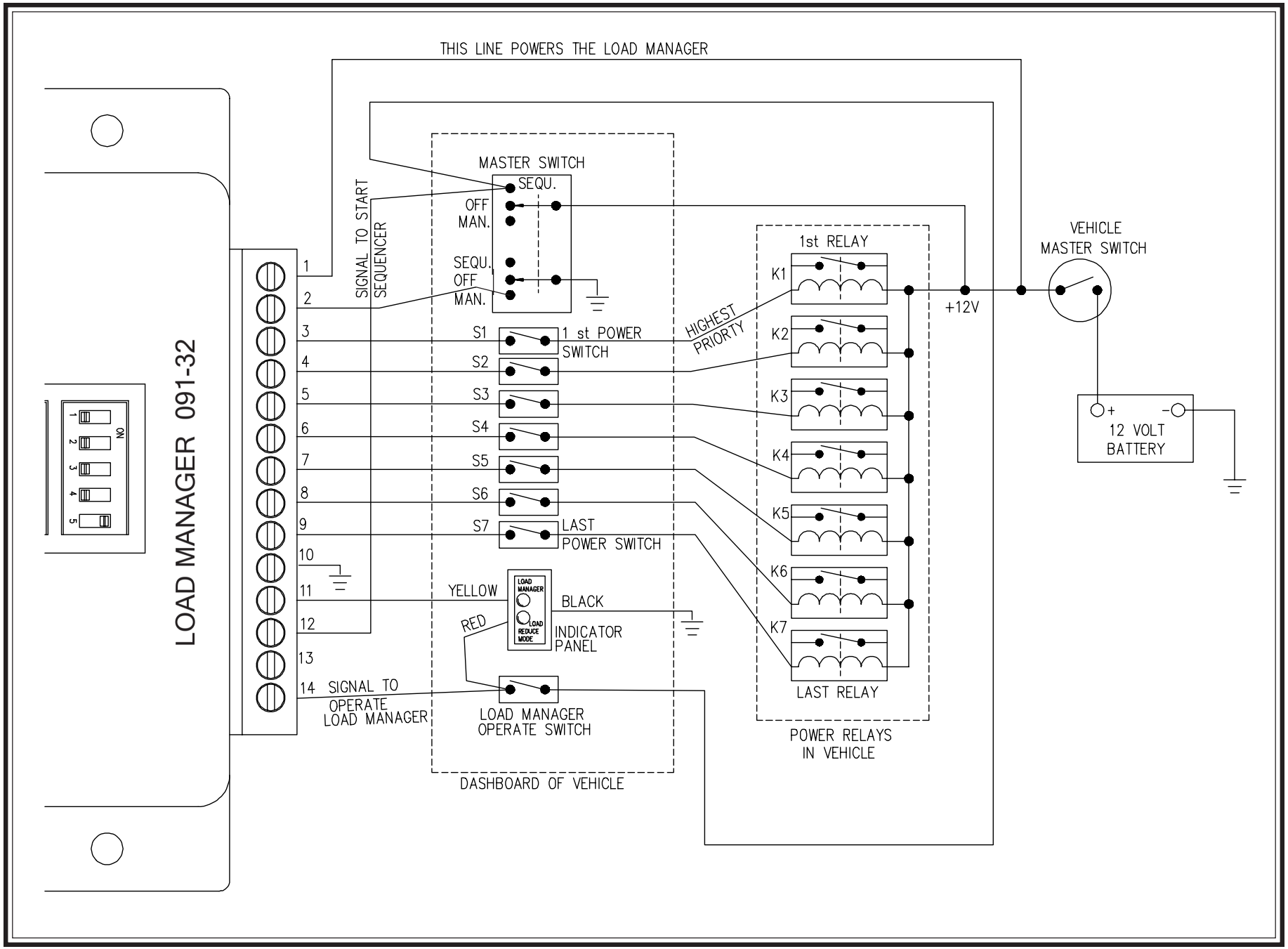

Figure 1, Schematic, Load Manager Installation

INSTALLATION RECORD & WARRANTY

Date Installed _____

Installed By _____

Vehicle Identification _____

Vehicle Owner _____

WARRANTY

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