



SPECIFICATION
SOLAR MESSAGE CENTER
MODEL SMC – 1000 HE

1.0 INTRODUCTION

This specification shall describe a trailer-mounted, portable sign upon which varying electronically generated lamp messages will be displayed to highway traffic as advisories or for the purposes of warning and/or control.

The equipment described shall be a standard model produced by a manufacturer with experience in the production of trailer-mounted traffic control products. All workmanship, materials, and assembly procedures shall be of quality design. Each component of the unit shall be adequate for and compatible with all structural and performance requirements of the complete unit. The equipment shall remain operational under inclement weather conditions.

1.1 DESCRIPTION

The Solar Message Center manufactured by Precision Solar Controls Inc. is a trailer mounted variable message board consisting of optically enhanced LED lamp matrix panels powered by a bank of batteries in order to convey bright, distinctive messages to the traveling public. The batteries are in turn recharged automatically by a group of solar panels located at the highest point on the unit. The Solar Message Center is designed with sufficient energy backup to operate for a period of 30 days at 75 degrees F. without sun exposure. The solar panel generator array shall recharge the battery bank at a rate of 2.5 hours peak sun to one 24 hour period of usage.

2.0 CONSTRUCTION REQUIREMENTS

2.1 GENERAL

The trailer and all mounted equipment shall be structurally adequate for unlimited, normal operation in wind velocities normally encountered on the roadway. The equipment shall be designed to enable one person to perform all transporting and deployment functions without assistance.

2.2 TRAILER

The 2-wheel trailer shall be structurally adequate to serve both as a carrier and as an operating platform for all components of the complete unit. The base structure shall be structural rectangular steel tubing of 2 inches by 6 inches in dimension, providing an adequate foundation for the unit. All tubing shall be joined by welding and all structural welds shall be continuous bead welds. All tubing ends shall be closed.

Axle and suspension systems shall be rated at 3,500 pounds minimum. Wheels and tires shall be a minimum of 15 inches, 4 ply, and shall be rated for towing at highway speeds of 65 miles per hour. A steel fender shall be installed over each wheel.

Four heavy duty crank type leveling jacks rated at 5000lbs minimum will be located at each corner of the trailer deck.

A lighting system shall be provided for the trailer and include tail lights, stop lights, turn signals, license plate light and reflectors. A trailer electrical cable and connector compatible with towing vehicles shall be installed. To eliminate wire chafing, all wiring shall be routed through split loom and clamped underneath the structural tubing. A 2-inch ball type trailer hitch with double safety chains in accordance with SAE J684F shall be installed.

2.3 MESSAGE SIGN

The sign panel shall be of aluminum construction and so assembled as to prevent dissimilar metal action from occurring. The sign panel cabinet shall be a fully welded assembly made of aluminum alloy.

The length of the Solar Message Center sign panel shall not exceed 128 inches. The front face of the sign shall be covered with a clear UV inhibited polycarbonate to prevent fading.

The Solar Message Center sign panel shall contain three (3) separate lines. Each line shall consist of 8 characters, equally spaced a minimum of 3 inches apart. Each character shall be 18 inches in height and 12 inches in width; each character configuration shall contain 35 LED lamp pixels in a 5 x 7 element arrangement. Each shall incorporate 4 LED's with a lens to produce 48 images and provide complete target size definition within the pixel area. Message color shall be approximately 590 nanometers.

2.3 MESSAGE SIGN – CONTINUED

The sign shall have capability to display up to eight (8) pages in a multiple page message, with variable timing in 1/10 (.1) second increments under computer control. The entire sign shall completely change all lines of message copy in not more than 100 milliseconds.

The sign shall be clearly visible and legible from a distance of 1,000 feet under both day and night conditions. Under variable light level conditions the sign shall automatically adjust its light source so as to meet the 1000 feet legibility requirements without being too dim or intense.

The Solar Message Center sign panel shall be supported on a telescoping upright member in a manner to permit raising the sign for operation and lowering the sign for transport. The upright shall include a device to enable 360° rotation and shall lock into the position to which it is manually rotated. Raise and lower travel shall nominally be 5 feet and shall be at least 7 feet above the ground when in the raised position. In a transport position, the sign shall orient to the longitudinal axis of the trailer in a manner that effectively reduces aerodynamic drag during towing.

3.0 POWER AND MISCELLANEOUS REQUIRED EQUIPMENT

The Solar Message Center shall be designed to accept two (2) power sources.

The first power supply type shall be a battery consisting of three size 4-D, deep cycle, lead acid 12 volt batteries wired in parallel. The battery bank shall be housed in a lockable heavy duty steel weatherproof battery box. The batteries shall be recharged by a solar panel array producing 110 watts of power minimum. There shall be a built-in battery charger with a minimum 25 ampere per hour rating.

The second power source shall allow the system to accept existing 120V commercial electrical service.

The two power sources shall be enclosed in an appropriate protective housing. The complete unit shall be painted with the manufacturer's standard colors and materials.

4.0 SYSTEM CONTROL REQUIREMENTS

The Solar Message Center shall be controlled in all functions by an on-board dedicated computer that shall:

- a) Be of solid state design and be removable
- b) Include a keyboard through which user originated messages may be entered for display or storage.

4.0 SYSTEM CONTROL REQUIREMENTS-CONTINUED

- c) Include an LCD display screen upon which messages can be reviewed before display on the message sign.
- d) Store a minimum of 250 preprogrammed messages for display when called upon by an operator through the keyboard.
- e) Store a minimum of 100 user originated multiple page messages.
- f) Maintain stored message list.
- g) Provide password coding or key entry.
- h) Provide control programming to present sequenced messages under operator control through keyboard entry.
- i) Provide control for moving arrow displays.
- j) Include a calendar program to automatically start and stop the display of sequences at predetermined times.
- k) Provide character board and battery diagnostics.

The computer shall be housed in a weather resistant, shock resistant lockable control box which shall include a light for night operation. The power control unit shall be housed in the lockable steel weatherproof battery box and contain two current meters, one to show the amperage generated with the battery charger and one to show the amperage from the solar panels to the battery bank. The power control unit shall also incorporate a PV regulator with thermal compensation for variances in ambient temperature to regulate the charge rate to the battery bank.

The Solar Message Center will include a photocell and associated control circuitry that will detect ambient light conditions and reduce the lamp intensity at night to reduce glare.

5.0 OPTIONS

The following options allow remote control of the Solar Message Center:

5.0.1 TELEPHONE LAND LINE OPTION

This option allows the operator to have remote control of the on board computer as described in paragraph 5.1.1 – Computer Base Operation. This option requires that a telephone line be run to the trailer site.

5.0.2 CELLULAR TELEPHONE OPTION

This option eliminates the need to run a telephone line to the trailer site. In addition, the trailer can be moved anywhere desired as long as there is cellular telephone coverage. This option allows the operator to have remote control of the on-board computer as described in paragraph 5.1.1 – Computer Base Station Operation.

5.1 REMOTE CONTROL

1. COMPUTER BASE STATION OPERATION

This option allows the operator to remotely have total control of the onboard computer. The operator can monitor and remotely control single or multiple message centers as if the operator were present at each unit. The minimum base station requirements are a PC compatible computer with internet access.

5.2 MICROWAVE DETECTOR OPTION

This option provides the system with the ability to determine the speed of approaching traffic and interrupt the programmed sequence with a special default sequence of messages.

SMC CENTRAL PROCESSING UNIT – CPU SPECIFICATIONS:

PROCESSOR.....Rabbit Core Microprocessor 22.1 MHz

POWER REQUIREMENTS.....175 mA @ 12V

**MEMORY TYPE & SIZE.....512 KB STATIC RAM
512 KB FLASH MEMORY**

MEMORY BACK – UP: SRAM/3 YEAR LIFE

TEMPERATURE.....-40° TO +75° C

HUMIDITY.....95 NON-CONDENSING

DISPLAY TYPE: LIQUID CRYSTAL DISPLAY-LCD

SCREEN SIZE.....240 X 64 DOT PIXELS

INTERFACES: RS232 & RJ11 PHONE JACK

LED LAMP MATRIX SPECIFICATION

PIXEL SIZE.....2” X 2”

CHARACTER SIZE.....18” H X 12” W

CHARACTER SPACING.....3.4”

LINES.....3

CHARACTER PER LINE.....8

LINE SPACING.....6”

FIELD OF VIEW.....MINIMUM 21° HORIZONTAL 7° VERTICAL

CONTRAST ENHANCEMENT FEATURES:

*** OPTICALLY ENHANCED LED – 4 LED PIXEL**

*** TRUNCATED DESIGN**

*** INTEGRATED LIGHT BAFFLES**

*** BLACK BACKGROUND**

*** HOUSING/VISOR**

ELECTRICAL CONTROL:

*** COMPUTER CONTROLLED/AUTOMATIC INTENSITY CONTROL ADJUSTS
LED OUTPUT WITH VARIANCES OF AMBIENT LIGHT AND
TEMPERATURE / PHOTOCCELL CONTROLLED**

*** OVERCURRENT PROTECTION: PREVENTS WAVELENGTH SHIFT
OVER TEMPERATURE AND CURRENT VARIATIONS**

SOLAR GENERATOR SPECIFICATIONS:

**SOLAR PANEL ARRAY..... 110-WATT MINIMUM
OPERATING VOLTAGE.....12.6 VDC
BATTERY BANK: THREE 4D DEEP CYCLE 12-VOLT BATTERIES 600
AMP HOURS TOTAL**

**CHARGE CONTROLLER: SERIES REGULATOR WITH THERMAL
COMPENSATION**

**LOW VOLTAGE DISCONNECT.....11.2 VDC
AC/DC BATTERY CHARGER.....25 AMP**

**THERMAL OVERLOAD CIRCUIT BREAKERS
LOCATED AT BATTERY BANK.....80 AMP**

SOLAR MESSAGE CENTER CELLULAR TRANSCEIVER

SPECIFICATIONS

FREQUENCY RANGE.....	824.04 – 848.97 MHz
TRANSMITTER	
	869.04 – 893.97 MHz RECEIVER
NO. OF CHANNELS.....	832
FREQUENCY STABILITY.....	+/- 2.5 PPM
OPERATING VOLTAGE.....	10.9 – 16.3 VDC
BATTERY DRAIN.....	STANDBY.....0.14 AMP
	TRANSMIT.....1.8 AMP
DIMENSIONS (TRANSCEIVER ONLY).....	4 X 9 1.125 INCHES
WEIGHT (TRANSCEIVER ONLY).....	1.8 LBS
OPERATING TEMPERATURE.....	-22° TO + 140° F
RF POWER OUTPUT.....	3 WATTS NOMINAL
INPUT/OUTPUT IMPEDANCE.....	60 OHMS NOMINAL
CONDUCTED/RADIATED SPURIOUS EMISSIONS.....	<-60 Db BELOW CARRIER
AUDIO DISTORTION.....	< 5% @ 1 KHz/0 KHz
DEVIATION	
HUM & NOISE (C-MSG).....	32 Db BELOW 8 KHz
DEVIATION	
MODULATION.....	F3; +/- .12 KHz @ 100% @ 1 KHz
AUDIO RESPONSE.....	0 DB/OCTAVE PRE-EMPHASIS TX
	0 DB/OCTAVE DE-EMPHASIS RX

SOLAR MESSAGE CENTER RADAR OPTION SPECIFICATION

***INTERFACES WITH SMC CENTRAL PROCESSING UNIT/SOFTWARE:**

The Solar Message Center shall be equipped with a radar system that monitors the speed of oncoming traffic. With the radar option, the SMC has two modes of operation, which allow the system to display a special sequence of preprogrammed messages. Warnings, statements, or vehicle speed may be displayed on the signboard once the SMC system radar has been triggered.

***RADAR ONLY MODE:**

When the system radar trigger speed has been exceeded, the SMC shall continuously display a special sequence of messages which have been preprogrammed into the computer. The actual vehicle speed may be displayed along with warnings, etc.

***RADAR TRIP MODE:**

This mode is used to display a normal sequence of preprogrammed messages until the radar trigger speed has been exceeded. Once triggered, the SMC will display a sequence of preprogrammed messages, which can warn the motorists and display their actual speed.

***SI-XLRM SPEED INTERFACE W/RS232 X-BAND LONG RANGE TRANSCIVER:**

FREQUENCY:	34.7 GHz (Ka band)
OUTPUT POWER:	.010 WATTS (MIN)/. 025 WATTS (MAX)
POWER DENSITY:	<. 001 WATTS/CENTIMETER ²
BEAM WIDTH:	12°
POLARIZATION:	CIRCULAR
OPERATING VOLTAGE:	9 – 16 VOLTS DC
OPERATING CURRENT:	370 mA DC
OPERATING TEMPERATURE:	-30°C to 70°C
SPEED RANGE:	5 MPH TO 200 MPH

***APPROXIMATE DETECTION DISTANCE OF AVERAGE SIZE VEHICLE:
2000-2500 FEET (DISTANCE WILL BE REDUCED WITH PRECIPITATION.)**

***SERIAL COMMUNICATIONS: RS232C,+TTL,-TTL**

***DATA FORMAT: 1 START BIT, 8 DATA BITS, 1 STOP BIT, NO PARITY.**

***DATA RATE: 9600 BAUD**

***PHYSICAL SIZE AND WEIGHT:**

Weight: 1.15 lb

Diameter: 2.6"

Length: 4.7"

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE