



**KAHLENBERG MODEL M-512
INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS
SOUND AND LIGHT SIGNAL CONTROLLER**

1.) GENERAL FUNCTIONS AND DESCRIPTION -

The function of the M-512 Sound and Light Controller is to provide convenient operation of sound signaling devices including navigation horns (ship's whistles), and Morse Light from a single control panel. At-Will signaling of horns or lights connected can be accomplished from this panel. Automated signals for Restricted Visibility and Maneuvering Signaling, as required by IMO (COLREGS) are programmed for output from this unit. In addition, the M-512 generates the SOLAS General Emergency Alarm Signal, to be activated by external push buttons if installed. External General Alarm Systems that generate the GEA signal can be alternatively be connected to the M-512, passing the signal through to all sound devices and lights connected to the M-512. The M-512 Sound and Light Control is also designed to be operated in conjunction with external Sound Surveillance Systems.

Multiple M-512 units can be utilized on the vessel and will communicate with each other in cases where multiple control stations are required. The M-512 operates on 12 or 24 Volts D.C. electrical current.

The M-512 is a compact solid state electronic control intended for installation in a location protected from weather, and includes a watertight faceplate when console mounted with the provided gasket. Electrical plug terminal connections on the rear of the unit accept 16-28 AWG wiring. The unit is operated from a flush mounted, dimmable, illuminated membrane switch keypad with embossed keys.

Power Source Required: 12-24 Volt D.C.

(See wiring diagrams herein for specific connections)

Electrical Current Flow Required : .5 Amp

Switching Capacity of Outputs: 2 Amps maximum, each output

Operating Temperature Range: -40 to 85 deg. C., -40 to 185 deg. F.

Installation Environment: Protected from weather, code B, IEC60945

Safe Vicinity to Compass: TBD

POWER INPUT:

Main Power M-512 Controller, **12-24 Volts D.C. ONLY**, (Terminals 11 and 12)

RELAY TERMINALS (External Power Source 12-240 Volts A.C. or D.C. Required)

Horn 1: 2 Amps Max. 0-240 Volts AC/DC (Terminals 13 and 14)

Horn 2: 2 Amps Max. 0-240 Volts AC/DC (Terminals 15 and 16)

Morse Light 1: 2 Amps Max. 0-240 Volts AC/DC (Terminals 17 and 18)

Morse Light 2: 2 Amps Max. 0-240 Volts AC/DC (Terminals 19 and 20)

Sound Surveillance Relay: 2 Amps Max. 0-240 Volts AC/DC (Terminals 21 and 22)

****NOTE:** Sound Surveillance Relay closes during horn signals generated by M-512.

External Switch Connections (Relays using External 12-24 Volt D.C. Power Source Only):

External At-Will Push Buttons, Horns (Terminals 8 and 9)

External Morse Key or Momentary Push button, Morse Lights (Terminals 6 and 7)

External General Emergency Alarm Push Button (Terminals 4 and 5)

Other Connections:

CAN (Control Area Network) Connection to connect additional M-512 Controllers,
PC/Touchscreen control or external switch control

SHIELD: Terminal 3

CAN LOW: Terminal 2

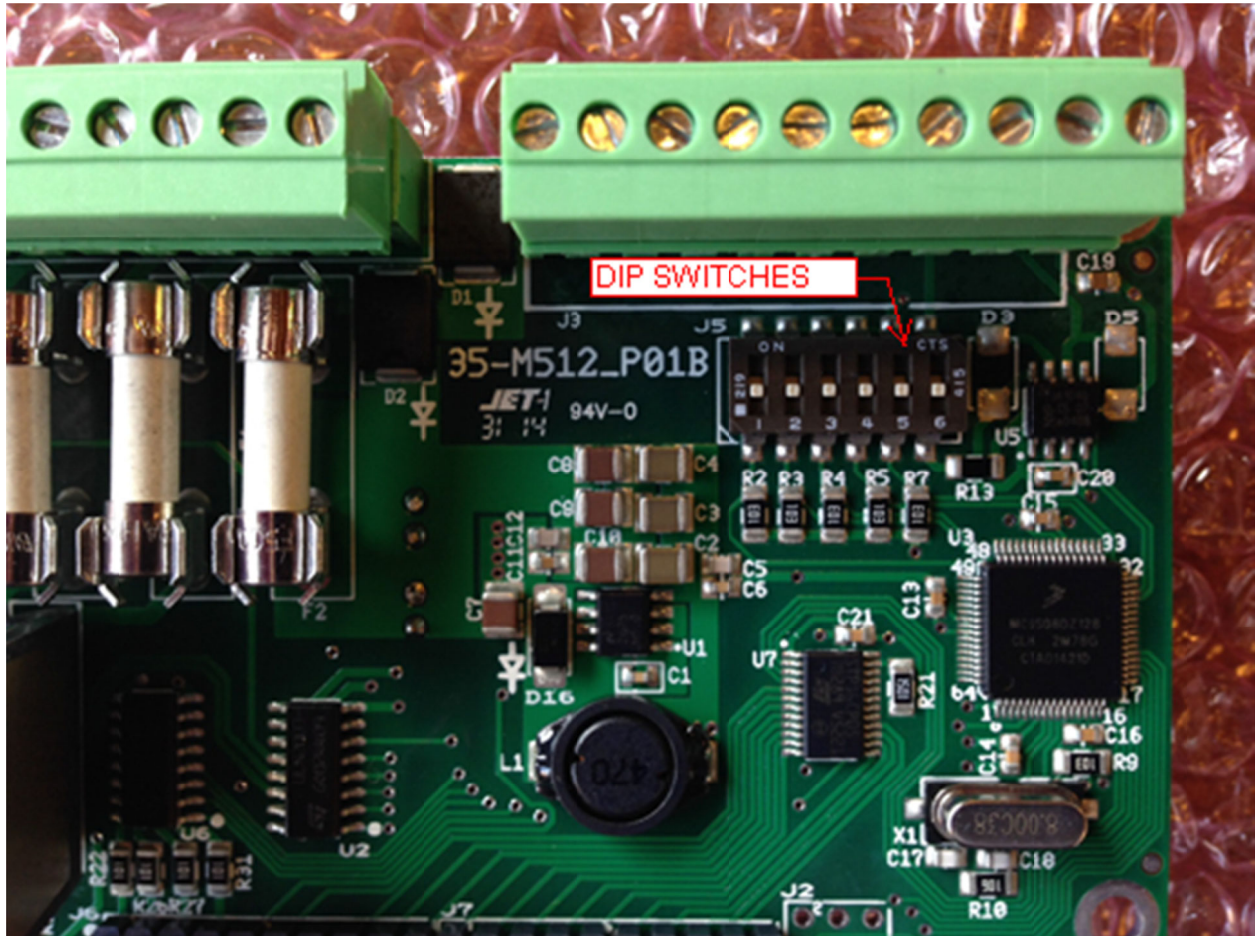
CAN HIGH: Terminal 1

2.) INSTALLATION -

WARNING: HIGH VOLTAGE MAY BE PRESENT INSIDE ENCLOSURES. BE SURE TO SHUT OFF POWER, TAG OUT, AND VERIFY NO VOLTAGE IS PRESENT BEFORE INSTALLING OR ATTEMPTING TO SERVICE THIS UNIT. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH.

INITIAL SETUP:

The M-512 includes DIP switches at location J5 on the main circuit board per the image below:



Setting J5 Switches

Settings on this switch assembly determine permanent functionality of the unit. Settings and functionality are as follows:

J5 DIP Switch Functionality:

TAB 1	CAN Address (LSB)
TAB 2	CAN Address (MSB)
TAB 3	CAN Communication (Off=disable, On=enable)
TAB 4	Spare 1 (unused)
TAB 5	Spare 2 (unused)
TAB 6	CAN Resistor (Off=disable, On=enable)

Tabs 1 through 6: Factory Default Setting is OFF.

For a single M-512 Controller operating onboard, without connection to outside switches or other M-512 Controllers, all TABS should be set to OFF position.

To operate two M-512 controllers onboard, the first controller must be set up as the “Master” control, with switches set as follows:

TAB 1 OFF
TAB 2 OFF
TAB 3 ON
TAB 4 OFF
TAB 5 OFF
TAB 6 ON

This “Master” controller is wired to all connected devices (horns, lights, etc.). The CAN terminals (1, 2, and 3) are connected from the “master” to the second “slave” controller.

The second M-512 “slave” controller must have J5 DIP switches set as follows:

TAB 1 OFF
TAB 2 ON
TAB 3 ON
TAB 4 OFF
TAB 5 OFF
TAB 6 OFF

NOTE: More than two M-512s cannot be operated together utilizing the CAN connection.

MOUNTING AND CONNECTIONS:

The M-512 is to be installed in a location protected from weather. It mounts easily into a console and is secured by fastening the bezel through the console to the enclosure with four (4) 4mm x 30mm mounting studs. An opening of 4.44” (113mm) wide x 2.38” (62mm) high should be made in the console where the unit is to be placed. The M-512 includes a bezel gasket for sealing between the mounting bezel and console surface. See details per Drg. 3-6871. An additional bead of RTV silicone sealant may be applied around the perimeter of the Bezel for additional ingress protection if the mounting surface is not perfectly flat or has a poor finish.

The M-512 includes male/female terminal blocks that can be disconnected for easier wiring to the unit, labeled per Drg. 3-6871. Wiring should be connected per Drg. 3-6868 utilizing shielded cables and wire gauge of 16 to 28 AWG size.

3.) OPERATION

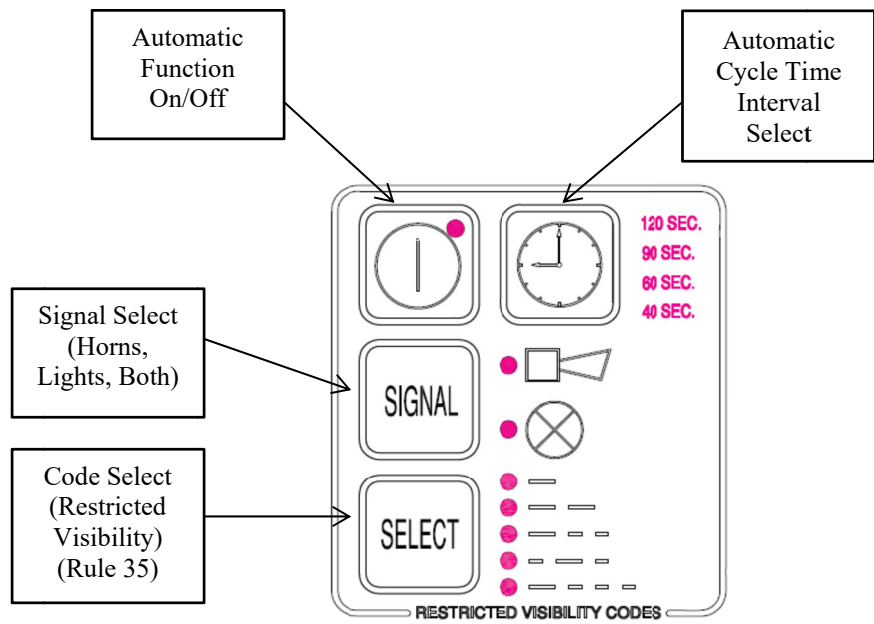
At-Will Operation of Connected Devices:

The buttons on the membrane switch panel correspond to each of the devices controlled by the M-512 unit. To operate any device connected to the M-512 on an “At-Will basis, simply press the appropriate button as follows:



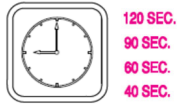
Automatic Operation of Connected Devices:

The M-512 generates automated signal codes for vessels in restricted visibility conditions according to International Maritime Organization requirements (IMO COLREGS, RULE 35). These automated signals are controlled by group of buttons designated “Restricted Visibility Codes” on the right hand side of the faceplate as shown below:



Automatic On/Off

The Automatic On/Off button starts and stops the automatic signaling of any selected horns or morse light. A red LED on this switch will illuminate when automatic signaling is turned on.



Automatic Cycle Time Interval Select

The Cycle Time Interval Select button selects the interval (120, 90, 60, or 40 seconds) that the selected code will be repeated. Per IMO requirements, a 120 second interval is standard. However, this button can be pressed repeatedly to cycle through the available time intervals to signal more frequently.





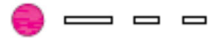
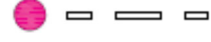
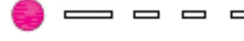
Signal Select Button

The Signal Select Button will select which devices are to be activated by the automated signal. Horns, Lights, or Lights and Horns can be selected by repeatedly pressing the button. Red LEDs will illuminate on the corresponding device graphics that represent each device to indicate the current selection.



Code Select Button

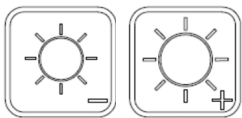
The Code Select Button selects the Automatic Restricted Visibility Code to be generated by the unit per IMO COLREGS, RULE 35. A Red LED corresponding to the selected code will be illuminated when the code is selected as follows:

- 
Making Way through Water (Underway) (One Long Blast)
- 
Underway But Stopped and making no way through the water (Two Long Blasts)
- 
Vessel not under Command (One Long, Two Short Blasts)
- 
Vessel At Anchor (One Short, One Long, One Short Blast)**
- 
Vessel being Towed or Restricted Maneuvering (One Long, Three Short Blasts)

Once automatic restricted visibility signaling is activated, it will continue until turned off by the “Automatic On-Off” switch. Any other At-Will button, externally connected or internal to the M-512 will discontinue the automated signal which must be restarted at the “Automatic On-Off” switch. The General Alarm or Maneuvering Signals if activated will also discontinue the restricted visibility code.

Automatic Maneuvering Signals: IMO COLREGS RULE 34

Pressing any of the Maneuvering Signals will generate the automated code for that signal as indicated on the button. Pressing a Maneuvering Signal will discontinue other automated horn/light restricted visibility signals in progress.

Dimmer Switches:

Dimmer Switches control the brightness of the membrane switch display on the M-512. Red LEDs, and all white backlighting are controlled by these switches.

External control of the dimmer switches is possible through use of CAN connection terminals or by connecting to the switch pins on the PCB. Contact Kahlenberg for additional details if required.

EXTERNAL PUSH BUTTON CONNECTIONS:

The M-512 includes 12-24 Volt D.C. relays allowing for the connection of external “At-Will” momentary push buttons for remote control of the horns and morse lights connected to the M-512 Control. See Drg. 3-6868 for connection locations. These external push buttons make contact for 12-24 Volts to the M-512 input from a remote power source.

OTHER FUNCTIONS OF THE M-512:**General Emergency Alarm:**

The M-512 is able to generate the General Emergency Alarm (Seven Short Signals followed by one long signal repeating) per SOLAS requirements. This signal will operate all connected horns and lights. This must be started and stopped by a “maintained” contact external push button not included with M-512, that is constructed in accordance with requirements as stated by various flag state authorities such as Kahlenberg Model M-322. Once started, the GEA signal code can only be discontinued by again pressing this remote installed GEA push button.

In the event an external General Emergency Alarm System is used to generate the GEA code onboard, terminals 6 through 9 on the M-512 can be used as inputs for 12-24 volt D.C. connection from the GEA external output to drive connected horns and lights.

Sound Surveillance “Mute” Relay:

A normally open relay is included in the M-512 that closes upon the activation of any horn controlled by the M-512 Control. This is available to mute an external Sound Surveillance System if installed on the vessel. See Drg. 3-6868 for connection location.

4.) CARE AND MAINTENANCE -

The M-512 Sound and Light Control is a solid state device designed to provide many years of maintenance free operation. However, in the event that a power surge takes place or inappropriate wiring connections are made, fuses within the unit will fail to prevent damage to the circuitry.

SPARE FUSES: Spare fuses are included with the M-512 Unit. Please note fuse requirements for each relay on the PCB per Drg. 3-6868

There are no additional user serviceable components included in the M-512. However if any parts or complete circuit boards as listed on the attached Parts List drawings are required for any reason, please refer to the associated part number when ordering. If the M-512 should fail to operate correctly for reasons other than a blown fuse as mentioned above, contact Kahlenberg Industries for recommended action or return to Kahlenberg for prompt analysis and repair.

For long term storage, the M-512 should be kept in dry conditions, inside dustproof corrugated packaging or equivalent including a silica gel packet for absorption of humidity.

When cleaning the membrane switch panel, we recommend the use of Windex (or equivalent) or a mild soap/water solution applied with a soft cotton cloth.

5.) DRAWING REFERENCES

Outline Dimensions:	3-6871
Parts List:	3-6870
Wiring Diagrams:	3-6868 (General), 3-6894 (Typical)

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