

## Automated LVD Connection & Setup

Documentation Revision 2

Products models: MXSL15/16 series.

### LVD (Low Volts Disconnect) Functions

The MXSL15/16 latch-type contactor installed between the battery and the load to monitor the battery voltage. If the battery goes lower than the shutoff-setting value, the contact will open to disconnect the battery from all loads including the contactor's control circuit itself. It also monitors another setting value which is alarm voltage to flash the LED and let the users know the battery is lower than the alarm-setting value.

Because the batteries are made from many different manufactures and many different voltage levels to indicate a low, the users have to setup the unit for what voltage level they need for their batteries.

The two settings, alarm and shutoff:

The alarm flashes the LED (pull low) at connector pin 5. If LED is not used simple leave it unconnected. If the LED already installed, set the LED mode to 0 will disable the alarm flashing or set alarm volts to lower than shutoff volts. When the unit shuts off before alarm, the alarm will never have a change to activate.

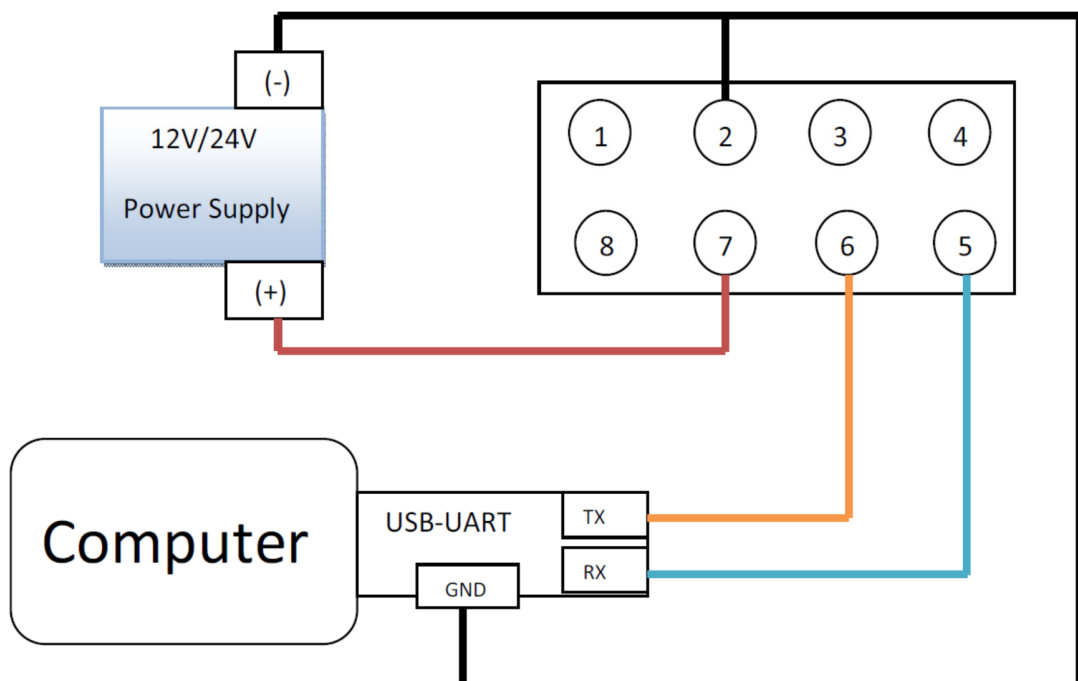
When shutoff is activated, it will shut down by open the contact. There is a delay time before the contact shutoff. This delay time is changeable from 0 to 255 seconds. When delay countdown to open the contact, LED flashes twice and repeat faster than the alarm flashing rate. The shutoff LED flashing can also be turned off by changing the LED mode to 0.

Beside automated-shutoff, a manual input at pin 6 can turn off the contact in case of an emergency or the users want to shutoff manually when seeing the alarm LED flashing. Leave pin 6 unconnected if no need for manual turn-off.

After the unit shuts itself off at low volts, users can push the start button to turn on the contactor for starting the engine. Because it is low-volts, the countdown to open the contact starts immediately after start-button is pushed (make sure to set the delay time long enough for your needs). When the battery volts still high while cranking the engine, the voltage could dip lower than shutoff-setting and countdown also starts. In either case, the delay time will allow users to start the engine and recharge the battery.

### Setup Connection

This device needs to be properly configured before install on the vehicle. Configuration interface uses UART similar to RS232, but the voltage level is 0V to 5V. An USB to UART adapter is required to make connection between this unit and the computer. COM port from the PC or USB to RS232 will not work because RS232 operates at +/-12V. The power supply to the unit for setup is 33V maximum between pin 2 and pin7 for both 12V and 24V coil-types. When in operation, the power supply (battery) have to comply with the coil voltage limits.



**Removed setup cable before deployment**

Setup Instruction

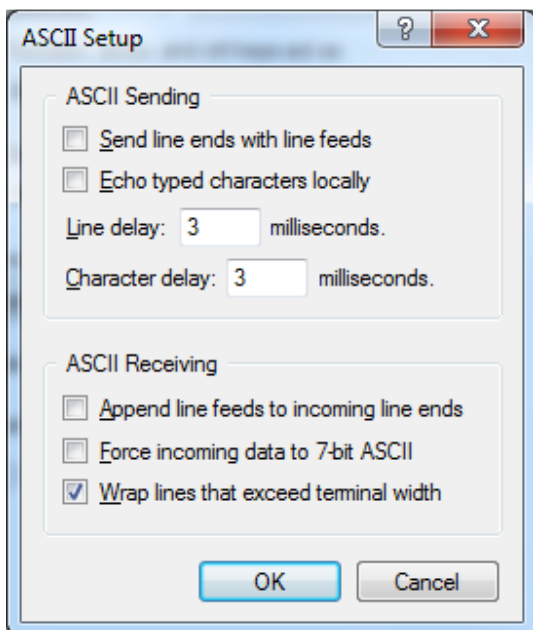
The dumb-terminal style application-software-programs or serial communication programs are widely available from the internet. Obtain a software-program install on the computer, run the program and set baud rate to 9600, 8 data bits, no parity, 1 stop bit and no hardware flow control. Follow the setup procedure to bring the unit into a setup mode. The contactor's setup mode is only available at first power-up.

When power first applies to this unit, it will send out "GIGAVAC MXSL15/16" to announce its presents and wait for 5millisecond to look for "LVD" characters from the serial port. If an "L" is received, it will delay 2 seconds each for the next 2 characters 'V' and 'D'.

### Setup Procedures:

1. Set the communication program parameters as mentioned above.
2. Select COM port on the software-program to points to the connected unit.
3. Hit [Caps Lock] on the keyboard.
4. While hold 'L' key to repeatedly sending out an "L" on the COM port every 3ms (see note for setup 3ms repeat-rate).
5. Turn on the contactor power.
6. When "GIGAVAC MXSL15/16" appears on the screen, release the "L" key right away.
7. Enter 'VD' within 2 seconds. If you entered 'V' within 2 seconds, you have 2 more seconds to enter the 'D' character.

Note: be sure to setup the communication program to repeat the characters every 3 milliseconds. Here is an example of the HyperTerminal settings. If using different program see user-guide for help.



## The setup command format:

Available Command Characters: '?', 'S', 'A', 'D' and 'L'.

A command is terminated by an <enter>. Each command needs to have a number between the command character and the <enter> except the '?' command that needs no number. A space or a comma after a command character is optional. If the value or number is invalid, it will return an error.

### Command details:

'?': read back, see what had been entered into the memory, coil voltage & firmware version.

'S': shutoff voltage, when the battery voltage falls below this value, the unit will shut itself off with a delay in seconds based on the 'D' command.

'A': alarm voltage, when the battery voltage falls below this value, the LED will flash.

'D': delay time in seconds, when shutoff is activated, the time to delay before the contactor shutoff. Delay range is from 0 to 255 seconds.

'L': LED mode, when the alarm or shutoff is activated, the LED flashes or stays off depends on this value.

### Commands parameters:

Enter the 'S' or 'A' voltage value multiply by 100 result in an integer value of 4 characters.

Example: to enter 12.35V, the value to enter is 1235. The analog to digital convert resolution is about 30mV/count. Enter the value in 10mV increment allows you to fine tune a few counts on the ADC in order to achieve optimal voltage value.

Enter the 'D' value exactly as the delay time in seconds.

Enter 'L' value from 0 to 3. 0=LED off for both shutoff and alarm. 1=LED-flash for alarm only. 2=LED flash for shutoff only. 3=LED flash for both alarm and shutoff.

To verify the data that had been entered correctly, send '?' command and hit <enter> to read back the values, make sure the contents are what you intended.

When send '?' command, the return data will be:

Shutoff volts, delay time, alarm volts, LED mode, Coil voltage and firmware version.

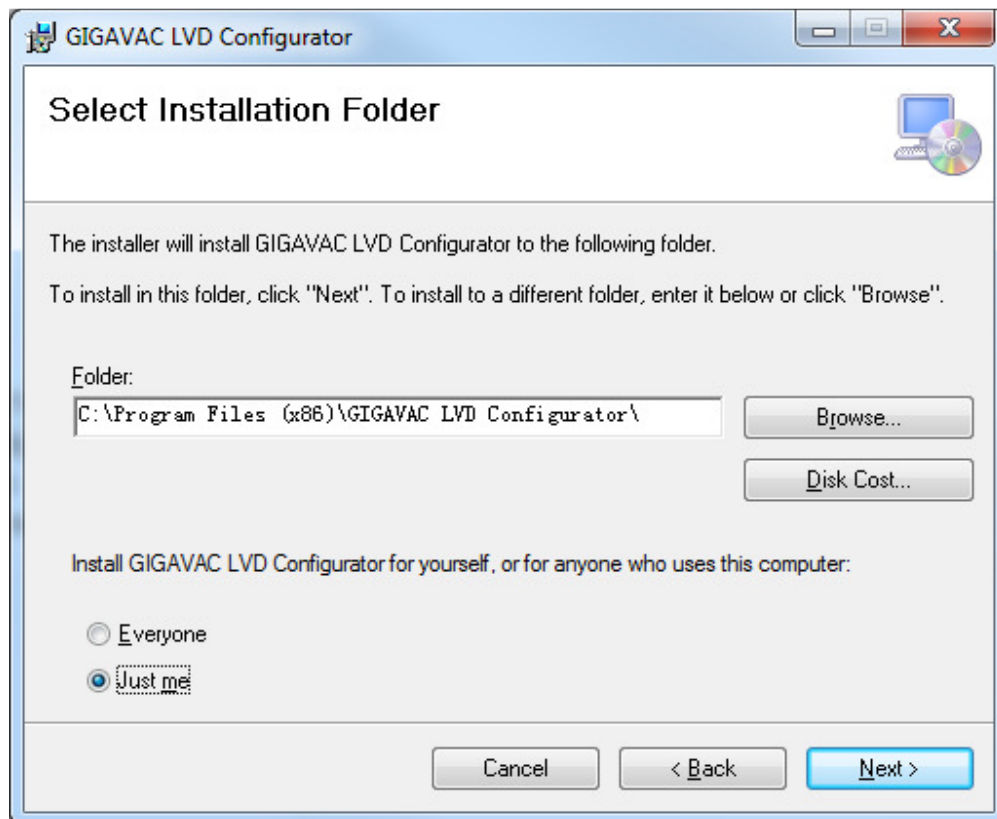
Example: S: 2015, D: 14, A: 2300, L: 1, C: 12, FW: 1A.

The 'C' value of '?' command is the coil voltage of the contactor that you are using either 12V or 24V.

Another way to setup is to download “MXSL15/16 (LVD) Configurator” software-program from GIGAVAC website. This program will provide graphical user interface to do the setting easier.

## Install the program with folder option:

The folder option is the location where the executable file will be located.



## Program User Interface



### "MXSL15/16 (LVD) Configurator" Software User's Guide:

1. Hooking up the unit using setup-connection diagram.
2. Run "MXSL15/16 (LVD) Configurator" program.
3. Select COM port that points to the contactor.
4. Click [Search MXSL] button.

5. Turn on the contactor power.
6. After seeing a result on the “Response Message” text box.
7. Select a command from the combo dropdown box.
8. Enter a value in [# Here], but no need to enter value for the ‘?’ command.
9. Click [GO] button.

To verify the data that had been entered correctly, select ‘?’ command to read back the values, make sure the contents are what you intended.

When send ‘?’ command, the return data will be:

Shutoff volts, delay time, alarm volts, LED mode, coil voltage and firmware version.

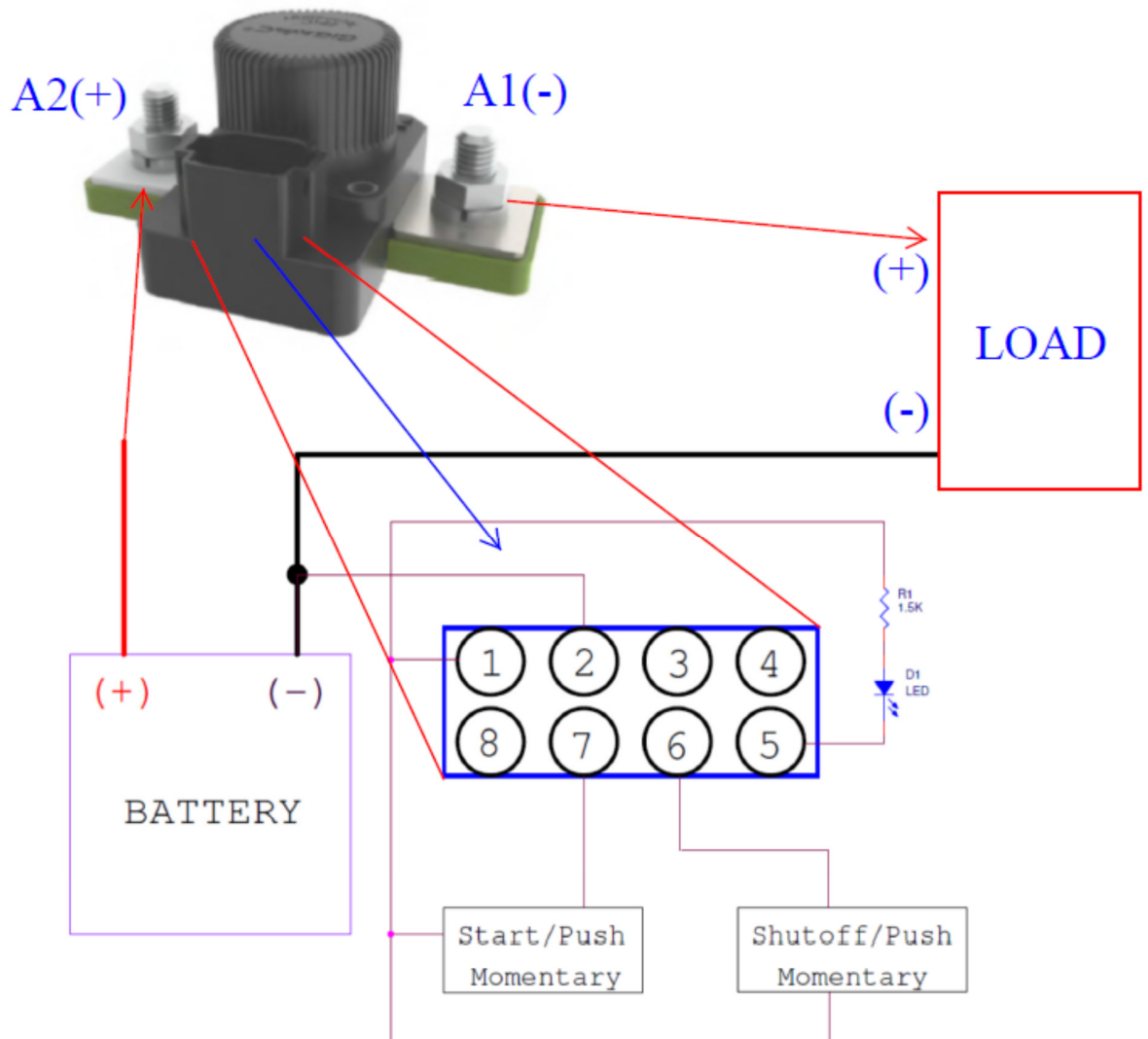
Example: S: 2015, D: 14, A: 2300, L: 1, C: 12, FW: 1A.

The ‘C’ value of ‘?’ command is the coil voltage of the contactor that you are using either 12V or 24V.

After setup is done, remove the COM cable before install the unit on the vehicle.

## Installation

### Operation wiring



**Information:**

1. Pin 1 of the connector is internally connected to A2 (+) for easy wiring in a bundle.
2. Shield the wires connect to pin1 or A2 (+) to prevent battery voltage exposing out.
3. The shutoff-switch & the LED are both connect to pin 1 (picture above) can move to A1 (-) or LOAD (+). It is up to the users' choice.
4. Always connect start switch to pin1 or A2 (+) from pin 7.
5. Adjust resistor R1 for our needs at pin 5 to drive the LED or a lamp up to 50mA max.

The contactors are opened by default. However, during transportation, the contacts could close unexpectedly. When completing the installation, if the contact is opened, the users need to push the start button to close the contact to begin its operations. If the contact was closed,



after installed, it will start its operation immediately. However, the contact was closed from the mechanical vibration or movement usually not fully engaged. If this happens, push the shutoff button to open the contact then push start-button to make sure the closing is properly making contact.

**Note:** push to start requires at least 75ms of holding time for the coil to have sufficient energy to close the contact. Push to shutoff will need about 200ms for the unit to filter out accidental-touches or noise-triggers.

## Electrical Parameters

- Voltage input to connector pin7 and terminal A2 (+) is 33V max. If over this limit could cause permanent damage to the control circuit.
- Pin1 is internally connected to the terminal A2 (+).
- Pin 2 is common (GND) or battery (-).
- Pin 5 is LED driver (pull low active), capable of driving up to 50mA.
- The A1 (-) terminal connects to the LOAD also provide power to the contactor control circuit after the contact had closed. It is internally connected.

Thank you for using GIGAVAC products.

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Revisions:

Rev. 1:



Initial completion.

Rev. 2:

- The '?' command will show 1 more value: coil voltage.
- Move setup information to the top.