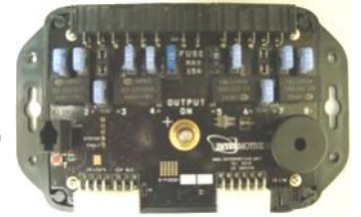


E-RSA752
Remote Stop/Start with Shift Lock and Fast Idle
2019 - 2022 Dodge Ram (Gas Engines Only)
Contact InterMotive for additional vehicle applications.



Introduction

The E-RSA752 product is designed for the boom truck market. It comes in two models – the basic and the enhanced or the “-E” model. The E-RSA752 is capable of all operations with key fob outside of the vehicle. This adds an obvious level of protection for the boom operator who can retain the key while working.

Basic Model (BV) – The E-RSA752-A basic model combines manual remote start/stop capabilities with shift lock and fast idle along with appropriate logic for controlling required boom functions. One input is used to engage/disengage fast idle, and two more inputs are for the remote start / stop. A hood switch interlock prevents the RSA752 from starting/stopping the engine if hood is open. Additional inputs are required to control other functions.

Enhanced Model (EV) – The E-RSA752-A-E model includes all the functions of the basic model with the addition of the following:

- Battery charge protection feature: auto-starts the engine when battery voltage (VBAT) falls below a programmed limit (2 different battery sources can be monitored independently).
- Independent ITC: engaged when the Master Switch is OFF.
- Aux battery current monitoring including “night feature” (see explanation below).

Installation Instructions

Disconnect vehicle battery before proceeding with the installation.



WARNING
Disconnect the battery to
prevent setting a check engine
light.

It is the installer’s responsibility to route and secure all wiring harnesses where they cannot be damaged by sharp objects, mechanical moving parts and high heat sources. Failure to do so could result in damage to the system or vehicle and create possible safety concerns for the operator and passengers. It is important to avoid placing the module where it could encounter strong magnetic fields from high current cabling connected to motors, solenoids, etc. Also avoid radio frequency energy from antennas or inverters next to the module. Finally, avoid high voltage spikes in vehicle wiring by always using diode clamped relays when installing upfitter circuits.

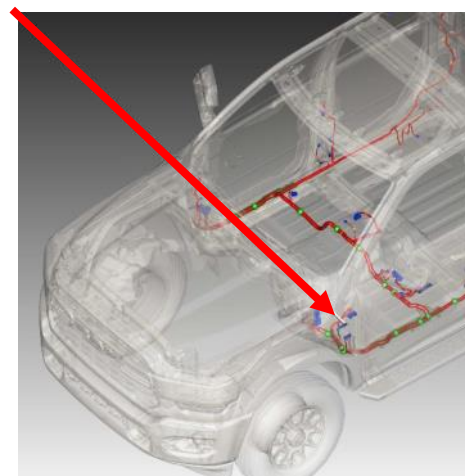
Installation Instructions (continued)

Data Link Harness

1. Locate the vehicle's OBDII Data Link Connector. It will be mounted below the lower left dash panel.
2. Remove the mounting screws for the OBDII connector. Plug the Red connector from the RSA752 Data Link Harness into the vehicle's OBDII connector. Ensure the connection is fully seated and secure with the supplied wire tie.
3. Mount the Black pass through connector from the RSA752 Data Link Harness in the former location of the vehicle's OBDII connector.
4. Secure the RSA752 Data Link Harness so that it does not hang below the lower dash panel.
5. Plug the free end of the Data Link Harness into the extended harness which then plugs into the mating 6-pin connector on the RSA752 module.



6. Locate the STAR connector bank in the location shown (next to the Park Brake).



7. Plug the 2-pin RSA752 connector into one of the unused ports on the upper bay towards the rear of the vehicle.



Installation Instructions (continued)

Ignition Switch Harness

1. Locate the vehicle's ignition switch connector located behind the ignition switch.
2. Remove the connector from the ignition switch (push in on tab and pull out).
3. Install the E-RSA752 harness between the ignition switch and the OEM connector.
4. Plug the 12-Pin connector into the mating 12-Pin connector on the E-RSA752 module.
5. Plug the single row 4-Pin connector into the mating 4-Pin connector on the E-RSA752 module.
6. Plug the 8-Pin connector into the mating 8-Pin connector on the E-RSA752 module.



HVAC Connection

No connections to the HVAC system will be necessary with the RSA752.

Key

One of the OEM key fobs will need to be modified and placed in the E-RSA752 enclosure following the instructions below.



1. Remove the key from the fob.



Installation Instructions (continued)

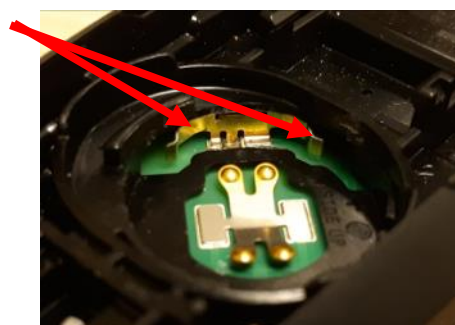
2. Remove the back cover from the key fob by prying it off using a small screwdriver as shown in the photo.



3. Remove the battery from the fob.



4. Install the InterMotive battery board into the key fob. Be aware that the battery board has 4 areas on the outer edges with no copper. Ensure that the copper will touch both of the contacts on the key fob.



Installation Instructions (continued)

5. Install the Intermotive plastic battery board retainer.



6. Apply the included Velcro strip onto the front of the key fob.



Installation Instructions (continued)

- Attach the key fob to the bottom of the RSA752 lid as shown in photo. Ensure the 2 pin connector header on the battery board will fit in the RSA752 enclosure.



- Attach the 2 pin harness (840-00010) to the mating connectors on the key fob and the E-RSA752 module.



E-RSA752 Power Lug

Connect a fused VBAT source to the 1/4" power lug. It is the installers responsibility to size the fuse accordingly. A fuse no greater than 60 Amps is recommended. The E-RSA752 is designed for a maximum cable size of 2 AWG for this power connection. Installer **must** provide strain relief on cable outside of the E-RSA752's enclosure. It is recommended that the strain relief be within 6" of the enclosure. The absence of strain relief could result in damage to the module.

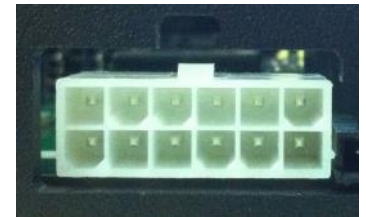
Installation Instructions (continued)

Attach the lid using the included screws ensuring the key fob is positioned on the side of the enclosure opposite the beeper.

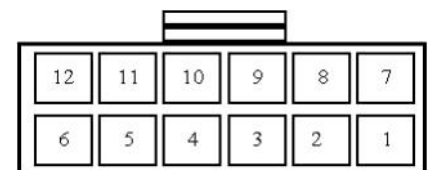


12-Pin Input Connector (J3) Definition

- Pin #1 - Master Switch (High True) - Must be asserted for equipment operations. Some functions are independent of Master Switch position (See below).
- Pin #2 - Compartment Lights (High True) - Controls the compartment lights as long as the vehicle Park Lights or Headlights are On. These will operate with or without Master Switch.
- Pin #3 - N/C
- Pin #4 - Manual Engine Start (Low True) - A momentary low input will start the engine and run it at base idle as long as "hood switch closed" input is active. There is no start warning when using this input.
- Pin #5 - Manual Engine Stop (Low True) - A momentary low input will stop a running engine. If the engine was started automatically, asserting this input is interpreted as an "Emergency Stop", and the engine will not auto start again until after a master switch cycle.
- Pin #6 - Aux Battery current sense (PWM). This input measures the current from a remote sensor. If the current draw is continually below a programmed threshold for an amount of time (configurable), the module assumes the vehicle is parked for the night and maybe the Master Switch was left ON inadvertently. (See operations section for further details).
- Pin #7 - Start/Stop button sense - Comes pre-built into the harness.
- Pin #8 - Manual Fast Idle (Low True) - Momentary low input will engage/disengage fast idle. The result of asserting this pin will differ depending on whether the engine is running or not. See the "Functional Notes" area of the "E-RSA752 Operation" section below for detailed explanation.
- Pin #9 - Current sense timer reset (High True) - A momentary high here will reset the countdown timer used for night (parked) operation . This should be connected to a source which asserts periodically whenever there is a person in the bucket .



12 Pin Input



Back of Connector

12-Pin Input Connector (J3) Definition (continued)

- Pin #10 - Hood Closed (Low True) - Safety input; engine will not start/stop if hood is not closed.
- Pin #11 - Aux Battery Input (Analog) - Monitors an auxiliary battery voltage source if so configured.
- Pin #12 - Boom Out of Rest (High True) - Active when boom is away from its home position.

5-Pin E-RSA752 Connector (J17) Pin-Out Definition

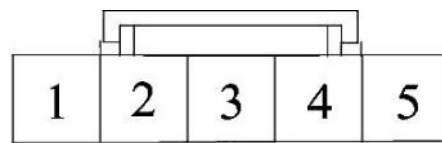
Each Main Power output is fused and rated at up to +12V/20A. The Low current outputs are not fused (but are self-monitoring) and are each rated at +12V/0.5A.

The 5 fused output pins on connector J17 are defined as follows:

- Pin #1 Compartment Lights
- Pin #2 Boom Lights
- Pin #3 N/C
- Pin #4 N/C
- Pin #5 N/C

Connect the desired outputs to vehicle equipment as needed. Tape up unused leads.

5 Pin Output



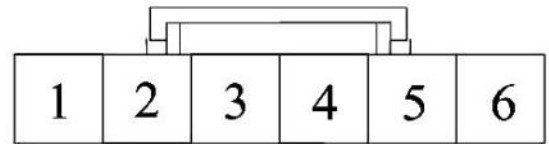
Back of Connector

6-Pin E-RSA752 Connector (J18) Pin-Out Definition

- Pin #1 - N/C
- Pin #2 - Hour Meter
- Pin #3 - N/C
- Pin #4 - N/C
- Pin #5 - Master 2 (12V)
- Pin #6 - Master 1 (12V)



6 Pin Output



Back of Connector

2-Pin E-RSA752 Connector (J20)

Connector J20 contains the two Black ground wires for relay output fuse sensing and low true relay outputs. This is not an optional connection. The wires in this connector must be attached to a good chassis ground for the system to function properly.



Reconnect the vehicle battery

E-RSA752 OPERATION

The majority of the E-RSA752 functions are enabled only upon turning on the Master Switch with the key fob present in the cab. However, Compartment Lights, Boom Lights, and ITC function (if configured) are active and can be operated regardless of the Master Switch position.

To activate all other functions, the following sequence should be performed:

1. Place the vehicle in PARK with the Park Brake applied and key fob in the vehicle.
2. Turn On the Master Switch. RSA752 will enter Master Mode. The beeper will start if fob not present.
3. The E-RSA752 is now in control of the ignition functions and is able to start and stop the engine automatically.
4. All RSA functions are now enabled; NOTE: When the Master Switch is turned On, the shifter will be locked. The shift lock is enabled (by default) when either the Master Switch is On or the boom is away from its rest position. Shift lock is disabled with Master Switch Off and the boom at rest. This can be changed via the programmability option of locking the shifter only when the boom is out.

Disable operation sequence for the E-RSA752:

1. Make sure the boom is back in its rest position so shift lock can be disengaged at the proper time.
2. Turn the Master Switch to "Off" - this will disable all E-RSA752 functions and return ignition control. If the fob is not present when the Master Switch is turned off E-RSA752 will stop the engine. NOTE: If for some reason the boom is not back at its rest position at this time, shift lock will remain engaged, and module will not go into Sleep mode as noted in #3.
3. If nothing else is done at this point, the E-RSA752 will go into a Sleep mode (low power) as soon as CAN traffic stops on the vehicle. Module "wakes up" as a result of CAN traffic resuming.

Functional Notes:

- The module has a Manual Engine Start input, and a Manual Engine Stop input which operate with the Master Switch engaged. Starting the engine manually will also start the Idle Timer Controller (ITC) if configured, and the engine will shut down at the end of the programmable delay; the default delay is set to 5 min. The engine runs at base idle when manually started. The beeper will announce 15 sec. before shutdown.
- The module has a single input for manually controlling fast idle. It will either engage or disengage fast idle depending on the current state. If (BV), the engine must be running in order to use this manual input; If (EV), the engine will first auto start (if not already running) and then go into fast idle. Any time fast idle is engaged, the ITC feature is overridden i.e. the engine will run at least as long as fast idle is engaged. ITC will resume counting down when fast idle is disengaged. Fast Idle can be temporarily disabled by pressing the service brake. Fast Idle resumes when the brake is released.
- (EV) The Charge Protect feature automatically starts the engine and engages fast idle when either of two battery voltages falls below a predetermined level. The engine will continue to run until the Stop conditions are met. The Stop conditions can be programmed in two different ways: 1. Engine stops after the battery voltage has risen to a fixed amount (1.6v above the low trip point) and has continued for an additional (configurable) amount of time or 2. Engine stops after a (configurable) time window without concern for voltage level. NOTE: voltage samples are filtered and must be consistent for 5 sec. (low threshold) and 3 sec. (high threshold) to be considered valid.

E-RSA752 OPERATION (Continued)

Functional Notes:

- Besides the low battery condition, additional preconditions for auto starting the engine for the charge protect feature are: 1. Vehicle in PARK. 2. Vehicle speed less than 2MPH 3. Engine Coolant temp. below 110 degrees C. and 4. Vehicle hood closed. If the Minimum ECT feature is enabled, this also becomes a precondition. NOTE: Fast Idle will not engage unless engine speed is between 400 and 2800 RPM.
- (EV) Any time the engine is running as a result of an auto-start and the manual Stop is asserted, the E-RSA752 treats this as an emergency Stop and will not allow any more auto-starts until after the next master mode cycle (i.e. disabling RSA functions by turning OFF the Master Switch and then back ON again).
- (EV) "Night Feature" If the aux battery current monitor is installed and enabled, the module monitors this current while the Master Switch is on. If the current falls below a configurable threshold for a continuous period of time (configurable), the module considers this to be a situation where the vehicle is parked for the night unattended. In this case, the module disables the auto start/stop feature. Further, if the aux battery voltages falls below an "emergency" value (configurable), the module turns off all loads under its control. If the main battery voltage falls below an "emergency" value (configurable), the module generates a Key Off condition which will cause the module to go to sleep (low power mode) after CAN traffic ceases. During the countdown time, if the current rises above the predetermined level, the timer will shut off and reset. Also during this period of counting down, a particular input (pin 9), if connected, can (by assertion) reset the countdown timer. In both of these cases, normal operation would continue with auto start/stop fully functional.

CURRENT SENSOR CALIBRATION

For the current sensor to operate accurately, it must first be calibrated. This is done with the sensor in a "no load" condition (i.e. no current flowing) by performing the following sequence: 1. Ignition mode in RUN state, engine OFF, and Master Switch OFF. 2. Press the red TEST button 5 times slowly (i.e. take about 2 sec. for a complete push and release). During this time, other LEDs may turn on and off. After the fifth time, the STATUS LED will be blinking 4 times (bursts). 3. Press and hold the Service Brake and press the test button one more time. The STATUS and FAULT LEDs will blink together and RED LEDs (8 through 4B) will turn on successively indicating the current sensor is taking readings and calibrating. If these last group of LEDs fail to turn on it may mean you were not applying the service brake. Once this sequence completes, the current monitor is calibrated. NOTE: the current monitor indicates a difference in current from that which it measured at calibration and the present value.

- (EV) Any time the engine is about to auto start, an external warning (if connected and enabled) will be heard either as a continuous or a beeped output (configurable) for an amount of time (configurable) prior to actual engine start. No such warning is given for an engine manual start.
- While the Master Switch is enabled, the E-RSA752 keeps track of engine run time. It stores this accumulated time (in seconds) in non-volatile memory, and using the download cable and a laptop, this time can be displayed. Besides an overall time (which just continues to accumulate), a resettable "lap time" can also be checked. To reset the lap timer: Have the Park Brake applied, Transmission in Park and Master Switch OFF. Pump the Service Brake rapidly (at least 4 times within 5 sec.). The beeper will briefly sound indicating the lap timer has been reset to zero.

E-RSA752 OPERATION (Continued)

Idle Timer Controller on Enhanced module (ITC):

As previously noted, the ITC feature is enabled when vehicle is operating in the Master Mode, but it is also enabled with the Master Switch OFF under the following preconditions: 1. Transmission in Park or Neutral, 2. VSS < 2, 3. Minimum ECT reached & 4. Engine running. The ITC countdown window is the same as for the Master Mode ITC operation, and pushing the service brake will reset the count as usual. The module beeper will sound 15 sec. prior to engine stop.

Diagnostics:

The E-RSA752 module has a number of LEDs and a "TEST" button that can be used to gain information about it's operation and assist in diagnosing problems. Some indicators are only meaningful to InterMotive Tech Support and are indicated below with "IM internal" :

- Status LED (1, amber): Has different definitions depending on the situation. In normal operation, it will be ON until Master Mode is entered, then it turns OFF. When in Diagnostic mode, it will either blink out the ID of the AFIS state or blink out the particular Diagnostic Page. Diagnostic pages (of which there are 4) are entered each time the "TEST" button is pushed (see below). If the Fault LED is ON, it will blink out the fault or error ID.
- Fault LED (1, red): Turns ON whenever there is an internal fault or error. Usually the "Status" LED will also be blinking if this LED is ON.
- Relay LEDs (8, green): Any time a power relay is energized, its associated LED turns ON.
- Fuse LEDs (11, red): Various definitions; In normal operation, any one of these being ON indicates the associated fuse is blown.

When in PAGE 1 of Diag. Mode , active LCO outputs on J4 are indicated as follows :

Fuse1	LCO1-Vehicle Secure	Fuse4B	LCO5-Ignition Control
Fuse2	LCO2-Engine Start Warning	Fuse6	LCO8-Current Sensor Power
Fuse4A	LCO4-Ignition Control		

When in PAGE 2 of Diag. Mode, active Digital inputs on J3 are indicated as follows:

Fuse1	Pin1 – Master Switch (High True)	Fuse4C	Pin8 – Manual AFIS Ctl (Low True)
Fuse2	Pin2 – Comp Lights (High True)	Fuse5A	Pin9 – Countdown Reset (High True)
Fuse3	Pin4 – Engine Start (Low True)	Fuse5B	Pin10 – Hood Closed (Low True)
Fuse4A	Pin5 – Engine Stop (Low True)	Fuse6	Pin12 – Boom Out of Rest (High True)
Fuse4B	Pin7– Key Sense (High True)		

When in PAGE 3 & 4 of Diag. Mode - IM internal.

Diagnosics (continued):

To enter Diagnostic "pages" requires pushing the Test button. After the first "push" the STATUS LED will blink out the state of the Fast Idle routine (IM internal). The next push puts you on Page 1 - STATUS LED will blink one time and repeat to indicate this. Pushing the button again will go to Page 2 with the STATUS LED blinking twice and repeat etc. After the fifth push, the program reverts back to normal operation. NOTE: while in any Diag. Page, normal operational functions continue.

Because the module LEDs are not readily observable, a method is needed to alert a person (in the bucket for example) of any faults that may have occurred. The module handles this by turning on the "Engine Start" warning for 2 sec then turning it OFF for 20 sec. then back ON again for 2 sec. etc. If this is observed, the user should remove the cover on the module to look at the STATUS LED to determine the fault code. It will be blinking out a 2-digit number with the following meanings:

41, 42	CAN Fault	47	LCO output Faulted
43	LCO Initialization Fault	48	Lost LIN data
44	Board over temperature Fault	49	STOP engine input active while trying to start engine
45	Current Sensor - Invalid Calibration Reading		
46	Current Sensor - Invalid Reading		

Parameter modification (optional):

The E-RSA752 has many parametric settings which dictate its operation. The module comes from the factory with default settings in place, but these can be adjusted in the field to suit the user. Additional equipment is needed to do this and also to view engine run times as stated earlier.

Required Equipment:

- USB to Serial Communication Cable (part number a-IPU) which is a one time purchase. This kit is required for all programming and is recommended to be kept in a central location.
- Laptop computer (parametric modification is done while module is installed on the vehicle)

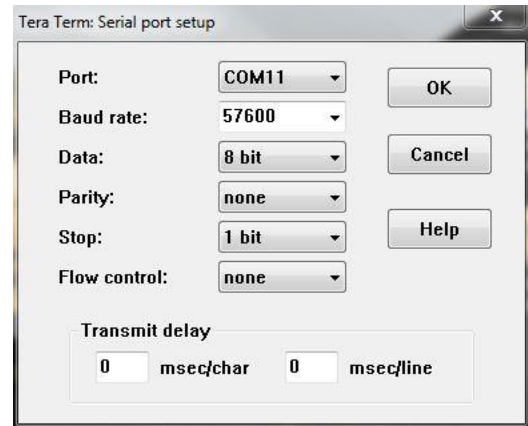
Reconfiguration

1. Ensure that the proper drivers are installed for the USB to Serial Communication cable provided by InterMotive. All driver files are located online at: <http://www.ftdichip.com/Drivers/VCP.htm>
2. Find the correct drivers for your system and follow the steps to download the latest version (located under the "Driver Version" heading). If unsure about the installation process, please contact InterMotive for further assistance.
3. Once the installation process is complete, plug the Communication cable into one of the computer's USB ports.
4. Download and install the latest release of the Tera Term application from: <http://www.intermotive.net>.
5. Ensure the vehicle's key is off and plug the other end of the download cable into the port labeled 'COMM' on the module.

Parameter modification (continued)

Reconfiguration

1. Open the Tera Term application. The Tera Term 'New Connection' window will open.
2. Click the 'Serial' button and choose the COM port that the Intermotive Download Cable is connected to (typically the highest numbered COM Port). Click 'OK'.
3. Under the 'Setup' tab, choose 'Serial Port'.
4. In the next window, you will need to change several of the default parameters for the Port Settings as follows:
 - Baud rate: 57600
 - Data: 8 bits
 - Parity: None
 - Flow Control: None
 - Transmit delay: 0 msec/char 0 msec/line
 - Click 'OK'.
5. Tera Term setup is now complete.



Making Changes:

1. Turn the vehicle key to the ON position. The RSA module will wake up and text will display on the open Tera Term window.
2. If text does not appear, unplug the 6 pin connector from the RSA module, wait several seconds and plug the connector back in.
3. With communication established, type in the characters **cfg** (followed by the enter key) and the screen will look like Screen Shot 1.
4. Enter the number (1 - 9) for the parameter you wish to change.
5. Follow the screen instructions to make changes. Changes are stored in non-volatile memory, so they will only need to be made once.
6. Press the ESC key to leave the configuration mode.
7. When finished, Key Off ignition and disconnect the communications cable.

```
RSA750A Configuration Mode
Modify parameters by selecting one of following numbers:
1 = Idle Shutoff Timer (delay)
2 = Min ECT for Idle Timer shutoff
3 = Min ECT threshold for Fast Idle operation
4 = Low (VBAT/Aux VBAT) threshold values
5 = Fast Idle duration (for Low VBAT trig)
6 = Fast Idle RPM value
7 = AuxBat Current Monitor
8 = Auto-Start Warning Duration
9 = System ON/OFF Functions

...Press ESC to Exit Configuration Mode

Select -->_
```

Screen Shot 1

NOTE: Typing the characters **itime** (then enter) will display the three values of accumulated engine running time.

S-HI23BX

- 1 OPEN (No Connection)
- 2 PINK (Auto Start Warning)
- 3 BLUE (Ignition Function)
- 4 DARK BLUE (Ignition Function)
- 5 GRAY (No Connection)
- 6 OPEN (Ignition Function)
- 7 YELLOW (+5V DC)
- 8 RED (No Connection)

840-00009

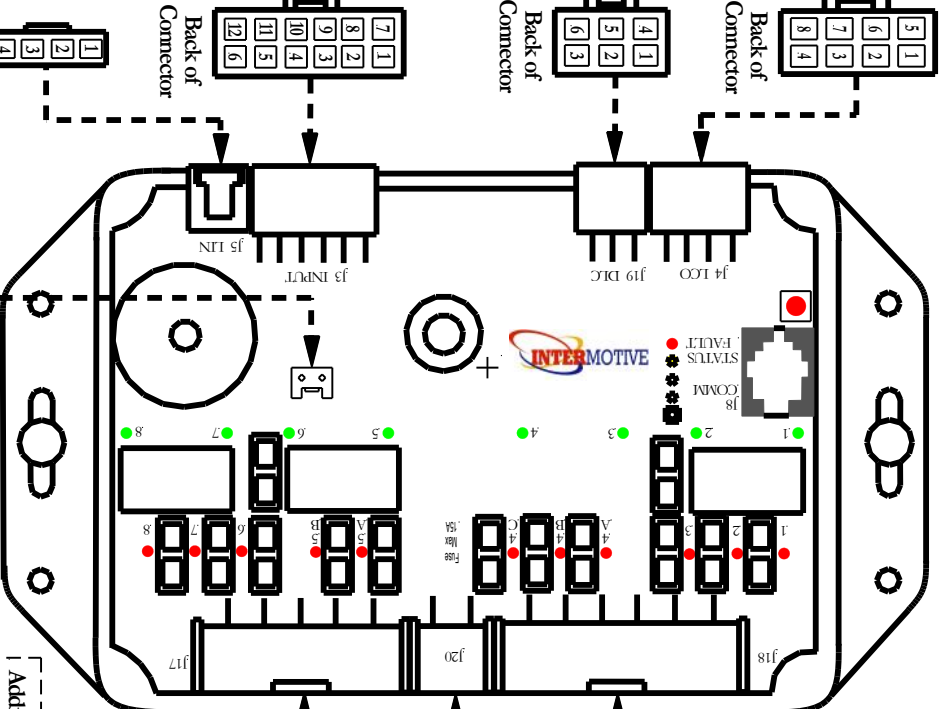
- 1 RED (Battery Voltage)
- 2 YELLOW (CAN 1 High)
- 3 OPEN (No Connection)
- 4 GRAY (Ground)
- 5 BROWN (CAN 1 Low)
- 6 OPEN (No Connection)

S-HI23BX

- 1 YELLOW Input 1 (Master Switch)
- 2 LIGHT BLUE Input 2 (Compartment Lights)
- 3 OPEN Input 3 (No Connection)
- 4 WHITE Input 4 (Engine Start)
- 5 ORANGE Input 5 (Engine Stop)
- 6 BROWN Input 6 (Aux. Battery Current Sense)
- 7 YELLOW Input 7 (Key Input from Ignition)
- 8 VIOLET Input 8 (Manual AFIS On/Off)
- 9 GRAY Input 9 (Current Sense Countdown Reset)
- 10 DARK GREEN Input 10 (Hood Closed)
- 11 RED Input 11 (AUX VBat Monitor)
- 12 DARK BLUE Input 12 (Boom out of Rest)

S-HI23BX

- 1 BLACK (Ground)
- 2 WHITE (Not Used)
- 3 DARK GREEN (Ignition Function)
- 4 WHITE (Not Used)



E-RSA752
S-M1521E-27

To Battery Board

- Additional Part Numbers**
- Current Sensor - 160-00006
 - Battery PCA - 830-00050-01
 - RS/A752 Module HW Kit - 850-00004
 - Kit Includes the Following:
 - Battery Board Harness - 840-00010
 - Battery Holder - 432-00003

Submit product registration at www.intermotive.net

If the E-RSA752 fails any step in the Post Installation Test, review the installation instructions and check all connections. If necessary, call Intermotive Technical Support at (530) 823-1048.