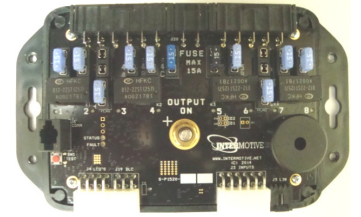


**RSA750**  
**Remote Stop/Start with Shift Lock and Fast Idle**  
**2014—2016 Dodge Ram**  
**Contact InterMotive for additional vehicle applications.**



### Introduction

The RSA750-A product is designed for the boom truck market. It comes in two models – the basic and the enhanced or the “-E” model. The RSA750-A is capable of all operations with ignition key removed. This adds an obvious level of protection for the boom operator who can retain the key while working in the air.

**Basic Model (BV)** – The RSA750-A basic model combines 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 RSA750-A from starting/stopping the engine if hood is open. Additional inputs are required to control other functions.

**Enhanced Model (EV)** – The RSA750-A-E model includes all the function of the basic model with the addition of the following:

- Idle Timer Controller (ITC) : shuts down a running engine automatically after a programmed amount of time.
- 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).
- A low power output: can be used to drive a warning device when the engine is about to auto-start.

### 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 antenna’s 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

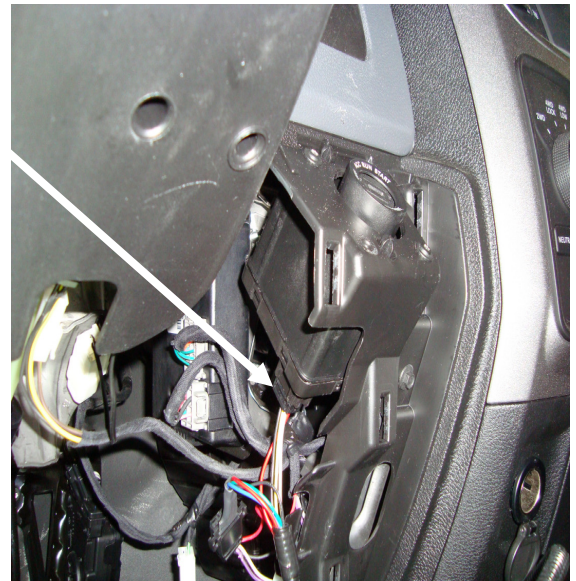
1. Locate the vehicle OBDII Data Link Connector. It's a White 16 pin connector around the area above the drivers left foot.
2. Use a flat screwdriver to remove the OEM OBDII connector. There are tabs on the sides of the connector that allow it to snap into place. Press the tabs and push the connector up and out of its bracket. The RSA kit includes a Data Link harness (see picture). Plug the red connector from the RSA Data Link Harness into the vehicle's OBDII connector. Ensure the connection is fully seated and secured with the supplied wire tie.
3. Mount the white connector from the RSA Data Link Harness in the former location of the vehicle's OBDII connector, by snapping it into place.



RSA Data Link harness "T's" into OBDII connector.

### Ignition Switch Harness

1. Locate the vehicle's ignition switch connector located below the steering column and behind the ignition switch (see photo).
2. Disconnect the connector from the ignition switch (push in on tab and pull out).
3. Install the RSA750 harness between the ignition switch and the OEM connector.
4. Plug the RSA750 12-Pin connector into the mating 12-Pin connector on the RSA750 module.
5. Plug the RSA750 4-Pin connector into the mating 4-Pin connector on the RSA750 module.
6. Plug the RSA750 8-Pin connector into the mating 8-Pin connector on the RSA750 module.



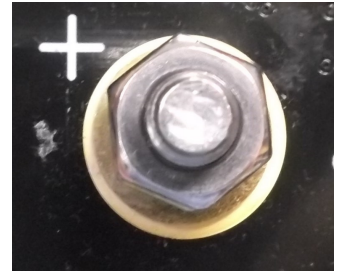
### HVAC Connection

1. Drop the main front HVAC panel to gain access to the rear of the HVAC controls.
2. Locate the large Black wire on the 5-pin (blower) connector located to the left, and cut this wire about three inches from the connector.
3. The short piece of the wire (connector side) should be stripped and connected (solder and either tape or heat shrink) to a 10 or 12 AWG wire that leads back to the RSA750 module.
4. The other side of the cut black wire should be taped up and tucked in so as not to interfere with surrounding devices.
5. Replace the front panel.

## Installation Instructions (continued)

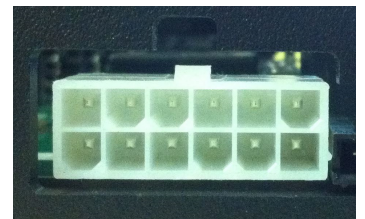
### RSA750 Power Lug

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 RSA750 is designed for a maximum cable size of 2 AWG for this power connection. Installer **must** provide strain relief on cable outside of the RSA750'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.

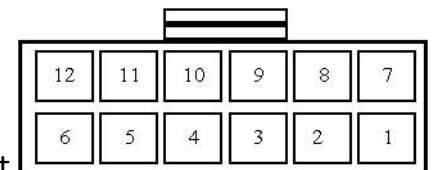


### 12-Pin Input Connector (J3) Definition

- Pin #1 - Master Switch (High True) - Must be asserted for "Key Out" and other operations. NOTE: when the Master Switch is turned on, the HVAC system is disabled disallowing any AC in the front cab. Some operations 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. There is no start warning when using this input. Starting the engine this way will also enable the Idle Timer (if so configured). When the programmed time has elapsed, the engine will automatically stop.
- 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 key cycle.
- Pin #6 - Aux Battery current sense (PWM). This input measures the current from a sensor attached to the aux. battery. 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 - Key In - 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 "RSA750 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 RSA750 Connector (J17) Pin-Out Definition

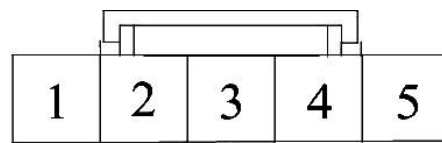
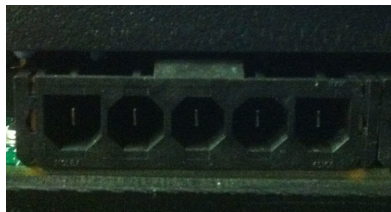
Each Main Power output is fused and rated at up to +12V/20A. The Low current outputs are not fused (but are self-monitoring) and are each rated at +12V/0.5A.

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



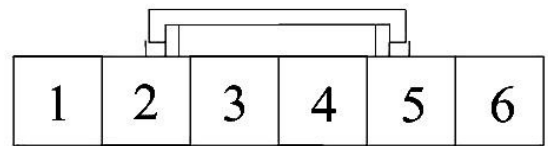
Back of Connector

## 6-Pin RSA750 Connector (J18) Pin-Out Definition

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



### 6 Pin Output



Back of Connector

## 2-Pin RSA750 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



## RSA750 OPERATION

The majority of the RSA750 functions are enabled only upon turning on the Master Switch. However Compartment Lights and Boom Lights 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 in the "Run" position.
2. Turn On the Master Switch — the beeper will start.
3. Turn key to ACC then to OFF position and remove key - beeper will stop and the master outputs will be enabled. Key should be kept out of ignition until it is time to drive the vehicle again. The RSA750 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 to locking the shifter only when the boom is out.

### Disable operation sequence for the RSA750:

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 RSA750 functions and return ignition control back to key operation. 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 (assuming the Key is out of the ignition), the RSA750 will go into a Sleep mode (low power draw) as soon as CAN traffic stops on the vehicle. Module will wake 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 (EV—Enhanced Version) will also start the Idle Timer Controller (ITC) if configured, and the engine will shut down at the end of the programmable delay. If (BV—Basic Version), there is no ITC feature so engine will run until the manual stop input is asserted. In both cases, the engine runs at base idle when manually started.
- 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.

## RSA750 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 RSA750 treats this as an emergency Stop and will not allow any more auto-starts until after the next key cycle (i.e. disabling RSA functions by turning OFF the Master Switch and then back ON again).
- 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 (configurable) period of time, 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. With Key in the RUN position, engine OFF, and Master Switch OFF, apply and hold the service brake. 2. Press the red TEST button 4 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 fourth time, the STATUS and FAULT LED 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 RSA750 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.

## Parameter modification (optional)

### Requirements:

- 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 (reconfiguration is done while module is 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.
2. Once the installation process is complete, plug the Communication cable into one of the computer's USB ports.
3. Ensure the vehicle's key is off and plug the other end of the download cable into the port labeled 'COMM' on the module.
5. Open the communication application HyperTerminal. This program can be found under: Start > All Programs > Accessories > Communications > HyperTerminal.
6. A prompt will appear to give this connection setup a name. It's recommended to use something meaningful such as "RSA Config".

The next window will prompt to select the COM port to setup the connection on. Typically, the highest numbered COM port will be the InterMotive Communication cable.

**Note:** This can be double-checked on Windows XP by right-clicking on 'My Computer' and selecting 'Properties.' From this window select the 'Hardware' tab and click on 'Device Manager.' In the Device Manager window, expand the 'Ports' menu and the download cable will display as 'USB Serial Port.'

In the next window, several of the default parameter for the Port Settings need to be changed:

Change the Bits per second to: **57600**, Data bits: **8**, Parity: **None**, Stop bits: **1**, and Flow control: **None**.

HyperTerminal setup is now complete.

1. Turn the vehicle key to the ON position. The RSA module will wakeup and text will display on the open HyperTerminal 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. If text still does not appear, go to File > New Connection and try re-configuring the HyperTerminal as described above. If unsuccessful, contact InterMotive for further assistance.
4. With communication established, type in the characters **cfg** (followed by the enter key) and the screen will look like Screen Shot 1.
5. Enter the number (1 - 8) for the parameter you wish to change.
6. Follow the screen instructions to make changes. Changes are stored in non-volatile memory, so they will only need to be made once.
7. Press ESC key when the parameters are set correctly.
8. 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**

(Auto Start Warning (+12V)) \_\_\_\_\_ N/C 1  
 (Ignition Function) \_\_\_\_\_ DK GREEN 2  
 (Ignition Function) \_\_\_\_\_ DK BLUE 3  
 (Ignition Function) \_\_\_\_\_ N/C 4  
 \_\_\_\_\_ N/C 5  
 \_\_\_\_\_ N/C 6  
 \_\_\_\_\_ WHITE 7  
 \_\_\_\_\_ N/C 8

(Battery Voltage) \_\_\_\_\_ RED 1  
 (CAN 1 High) \_\_\_\_\_ YELLOW 2  
 (CAN 2 High) \_\_\_\_\_ GREEN 3  
 (Ground) \_\_\_\_\_ GRAY 4  
 (CAN 1 Low) \_\_\_\_\_ BROWN 5  
 (CAN 2 Low) \_\_\_\_\_ BLUE 6

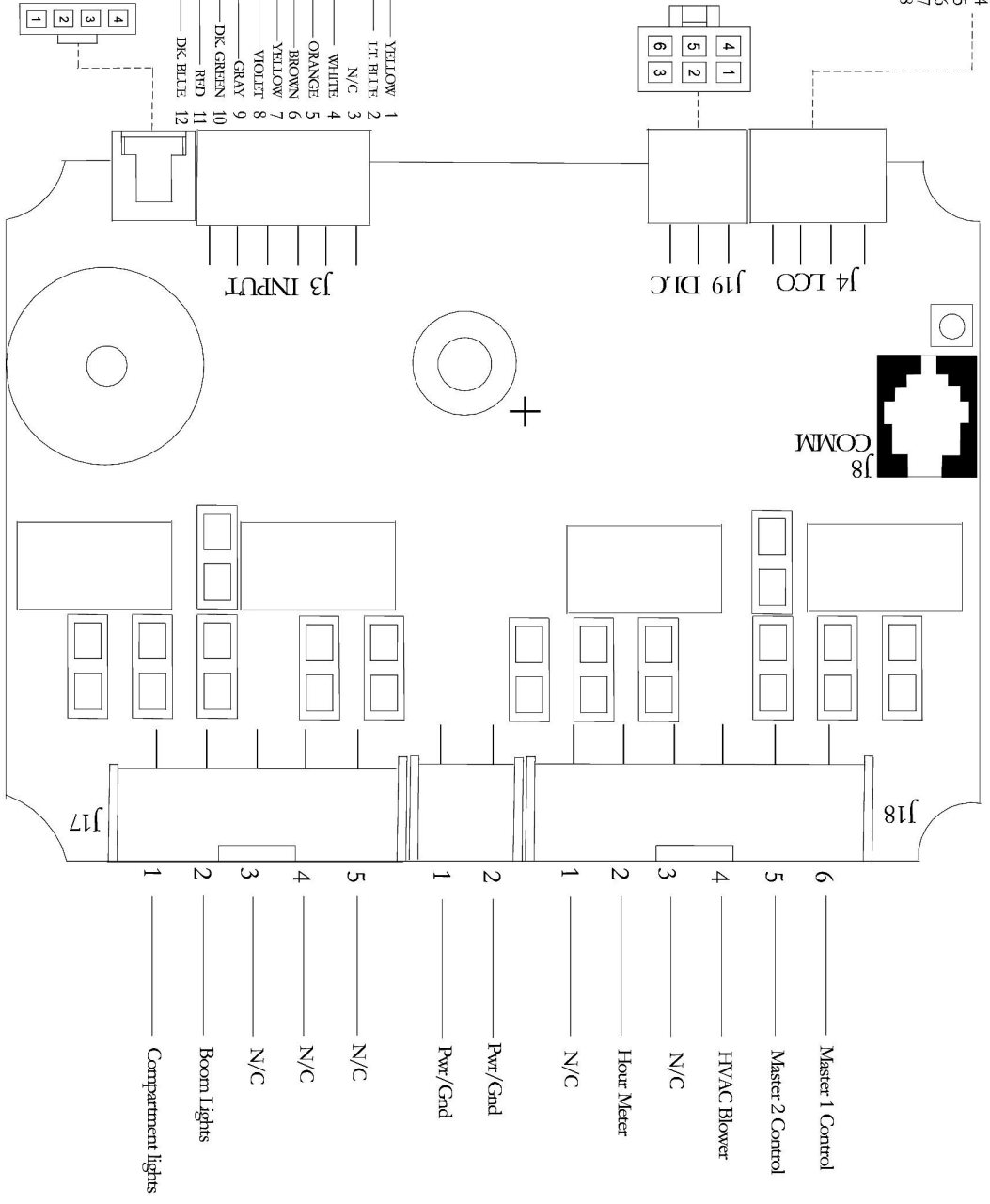
Plug and Play  
 Data Link Harness

S-H123AX

Input 1 (Master Switch - High True) \_\_\_\_\_ YELLOW 1  
 Input 2 (Compartment Lights - High True) \_\_\_\_\_ LT BLUE 2  
 Input 3 (Spare) \_\_\_\_\_ N/C 3  
 Input 4 (Engine Start - Low True) \_\_\_\_\_ WHITE 4  
 Input 5 (Engine Stop - Low True) \_\_\_\_\_ ORANGE 5  
 Input 6 (Aux. Battery Current Sense) \_\_\_\_\_ BROWN 6  
 Input 7 (Key In from Ign. - +5V High True) \_\_\_\_\_ YELLOW 7  
 Input 8 (Manual ATIS On/Off (Low True)) \_\_\_\_\_ VIOLET 8  
 Input 9 (Current Sense Countdown Reset (High True)) \_\_\_\_\_ GRAY 9  
 Input 10 (Flood Closed - Low True) \_\_\_\_\_ DK GREEN 10  
 Input 11 (Aux VBat Monitor (Analog)) \_\_\_\_\_ RED 11  
 Input 12 (Boom out of Rest - High True) \_\_\_\_\_ DK BLUE 12

To Aux. Battery Current Sensor  
 Ignition Function \_\_\_\_\_ DK GREEN 3  
 +5V DC \_\_\_\_\_ RED 2  
 Ground \_\_\_\_\_ BLACK 1

Back of Connector



**RSA750**  
 S-M1520E-10

**Submit product registration at [www.intermotive.net](http://www.intermotive.net)**

If the RSA750 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.