

waySmart® 850 | HD

Installation Manual



driver safety | fleet management | compliance



inthinc™

About this Document:

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E	Added Satellite Antenna Installation Instructions	Scott Vecchiarelli	2/18/2014
F	General Changes	Andrew Helm	6/9/2014

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About the waySmart™ Device

FCC Notification:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications; however, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. Consult the dealer or an experienced radio/TV technician for help.

Industry Canada Notification:

This product meets the applicable Industry Canada technical specifications. This Class B digital apparatus complies with Canadian ICES-003. Changes or modifications to the tiwiPro™ /waySmart™ that are not expressly approved by inthinc, inc. could void the user's authority to operate the tiwiPro™ / waySmart™.

About inthinc™

inthinc is a global company centered on telematics, fleet solutions and driving safety. Its breakthrough driving safety solutions are designed to safeguard lives, save money and protect the environment. inthinc technology dramatically improves driver behavior and has been documented to reduce accidents by more than 80 percent. For more information please visit www.inthinc.com.

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Introduction to waySmart™

In This Chapter...

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This chapter will introduce inthinc Technology and how our products are designed to improve driver performance, reduce crashes, increase fleet productivity, improve fuel mileage, and reduce emissions.

About this Guide

This manual provides the most up-to-date installation requirements and instructions for the waySmart™ 850 system. This manual should serve as a starting point and study guide for the technician trainee, and as a reference manual for the certified technician.

Installation of the inthinc waySmart™ system requires great attention to detail, as inthinc maintains a high-standard for quality workmanship. If the waySmart™ system is not installed by a trained and certified technician, or is not installed correctly, the product may not work as intended and the product warranty may be voided.

Information within this document changes frequently. We recommend obtaining the latest version of this manual, before completing any new installation. This manual, along with other resources can be found online at inthinc™ University (<https://training.inthinc.com/iu>).

For system support or for assistance with installation of the waySmart™ product, contact:



24-Hour Technical Support

(866) 294-8637 opt. 3

OR

support@inthinc.com



inthinc Technology

Since its inception in 1997, inthinc has focused its efforts on developing solutions to positively impact driver behavior. At the heart of this unique approach is the ground breaking safe driving system, which mentors drivers to help them become better, safer, and more efficient. Based in Salt Lake City, Utah, inthinc's global efforts have been proven and documented to dramatically improve driver behavior, reduce crashes, increase fleet productivity, improve fuel mileage and reduce emissions.



Many of the world's most safety-conscious organizations from NASCAR® to multi-national companies, have turned to inthinc. inthinc provides the only comprehensive driving safety system that changes driver behavior in real-time to improve safety and fleet efficiency. inthinc solutions provide a unique combination of in-vehicle driver alerts, vehicle location and diagnostics, distracted driving prevention and fleet management features that detail performance trends for individual drivers or the entire fleet. This advanced, patent-pending technology and approach has led to dramatic improvements in driver safety.

Primary Features include:

- In-vehicle, verbal mentoring in real-time for driving behaviors such as speeding, seatbelt usage, unsafe turns, hard braking, and rapid acceleration.
- Speed-by-Street™, which compares vehicle speed to a proprietary database of posted speed limits on public roads.
- smartZones™ for advanced geo-fencing capabilities.
- Real-time incident notification via text message, e-mail, or phone call.
- Real-time and historical reporting via web-based portal for instant feedback and trend analysis.

inthinc Solutions

inthinc solutions include applications for **heavy industry**, **commercial fleets**, and **families**.

For fleets and small businesses, inthinc delivers the most immediate, far-reaching results in the industry, often providing millions of dollars in cost savings each year and typically repaying the investment within one year. inthinc solutions have demonstrated dramatic results including the following:

- 73% Increase in Seatbelt Usage
- 90% Reduction in Speeding Violations
- 89% Reduction in Aggressive Driving Behaviors
- 80% Improvement in Vehicle Crash Rates

In addition, companies can improve operational efficiencies by reducing idle times, unauthorized miles, and overtime claims. According to the Environmental Protection Agency (EPA) in the U.S., driving the speed limit, avoiding rapid acceleration and braking, and eliminating excessive idling can:

- Lower Fuel Consumption by as much as 23%
- Reduce CO² Emissions up to 50%

For families, inthinc is forever changing the course of teen driving by providing driving alerts that help young drivers instantly avoid unsafe situations. This is coupled with an unprecedented set of tools to help parents instruct and protect their teens.



waySmart™ 850 Device



tiwiPro™ Device

Changing Behavior

The single greatest variable in the operation of a vehicle is the driver. If the driver isn't operating his or her vehicle safely, the most advanced safety features like ABS brakes, or stability control systems are rendered useless.

Over the years, great strides have been taken to implement vehicle safety features and enhance driver training; however, most of these measures are reactionary and do not correct the specific behavior that leads to dangerous or inefficient vehicle operation at the time of the infraction.

A study commissioned by the Federal Motor Carrier Safety Administration (FMCSA) in the U.S. called "Large Truck Crash Causation Study" shows that drivers of large trucks are ten times (10x) more likely to be the cause of the crash with other vehicles involved than any other factor, such as weather, road conditions, and vehicle performance. inthinc is the only telematics company that addresses changing driver behavior and sustaining it.

Customer Success:

73% Increase in Seatbelt Usage

90% Reduction in Speeding Violations

89% Reduction in Aggressive Driving Behaviors

80% Improvement in Crash Rates

How It Works

If a driver performs a potentially unsafe vehicle operation, the system will provide an audible notification or coaching. If the driver fails to correct the behavior within an allotted grace period, a notification is sent to the portal for administrative review. Notifications are sent using a variety of communication methods including: Cellular (GPRS), Satellite, and Wi-Fi.

Drivers are scored based on their overall driving record and performance. All drivers start with a perfect score, which is then negatively impacted by any unsafe driving violations. inthinc has developed a scoring formula that takes into account the egregiousness or severity of the driver behavior. For instance, if two drivers both receive speeding violations and driver A was speeding at 5 mph over the limit for a quarter-mile and driver B was speeding at 15 mph over the limit for 5 miles, driver B is going to have a greater impact to their score because of the severity of the violation based on speed and distance.



The inthinc Effect

inthinc helps put drivers on the safest road possible, with positive impact across an organization. Companies across the globe are experiencing what is known as the inthinc effect. From the instant inthinc technology is deployed, drivers become more aware and operate more safely. This enables companies and organizations to safeguard lives, save money, and protect the environment.

Saving Lives

The single greatest variable in the operation of a vehicle is the driver. If the driver isn't operating his or her vehicle safely, the most advanced safety features such as ABS brakes or stability control systems are rendered useless. inthinc is the only telematics company that truly addresses driver behavior. Its driving safety systems have been proven to change driving behavior and sustain it. By leveraging vehicle telematics and focusing on driver behavior, inthinc clients, through hundreds of millions of miles driven see an 89% improvement in aggressive driving behaviors and an 80% reduction in accident rates per million miles driven.

Saving Money

No matter the number of vehicles a company operates, fleet managers face the daunting task of maximizing the safe performance of their drivers, knowing how and when fleet vehicles are being used and ensuring the efficiency of their vehicles and drivers - all while controlling costs. With hundreds of millions of miles of on-the-road experience, inthinc technology has been proven to dramatically reduce accident rates, decrease operating costs and increase fleet efficiency. Conservatively, each year inthinc saves its clients millions of dollars by avoiding crashes as well as reducing fuel usage, maintenance costs, and insurance and liabilities.



Protecting the Environment

inthinc solutions not only save lives but also alleviate some of the environmental and financial costs associated with automobile emissions. While each vehicle reaches its optimal fuel economy at a different speed (or range of speeds), gas mileage usually decreases rapidly at higher speeds. Put simply, obeying the speed limit increases fuel efficiency. And when vehicles are most fuel efficient, they burn less gas and introduce less CO² into the atmosphere. Speeding and aggressive driving and excessive engine use (from idling or unnecessary trips), can combine to more than double CO² emissions. Limiting these behaviors would result in unprecedented reductions in CO² emissions nationally and worldwide. inthinc solutions are designed to address these environmentally unfriendly driving behaviors. Current customers have experienced significant improvements in each of these behavioral areas.



The inthinc Advantage

With game-changing, practical innovations, inthinc helps ensure its latest solutions deliver the greatest benefits. Hundreds of millions of miles with proven ROI show the inthinc advantage: clients experience valuable benefits including reduction in crashes, lower operating and maintenance costs, improved productivity and reduced fuel consumption, all of which leads to a competitive edge for clients.

Getting Started with waySmart™

In This Chapter...

- ▶ **What is the WS850 Solution?** 17
- ▶ **WS850 System Hardware** 19
- ▶ **Recommended Tools & Supplies** 21
- ▶ **WS850 Installation Overview** 23

This chapter will provide information about WS850 hardware components, what tools and supplies are required to complete an installation, and a high-level overview of the installation process.

What is the WS850 Solution?

The waySmart™ 850 is the next generation waySmart device. The waySmart 850 is designed to be more modular and easier to manage and install. The WS850 allows inthinc to accommodate all customer needs and be “solution” focused and not “hardware” focused.

The WS850 solution is currently separated into two hardware groups: The WS850 “Heavy” and the WS850 “Lite”. The WS850 Heavy comprises two main components; the WS850 Unit (IVMM) and the Touchscreen (HMI200) User Interface. The combination of the WS850 and a comprehensive User Interface allows inthinc to provide solutions to a wide array of customers. Some of the “solutions” available for the WS850 Heavy include:

- Electronic Hours of Service (HOS) Logs
- Automated IFTA Tax Reporting
- 2-Way SMS Messaging
- Road Hazard Awareness
- Driver Vehicle Inspection Reports
- Navigation and Efficiency Routing

The WS850 Lite comprises of one main component; the WS850 Unit (IVMM). The WS850 Lite platform allows inthinc to provide solutions to customers that do not require the comprehensive user interface and therefore can develop solutions based on our customer needs. Some of the solutions for the WS850 Lite include:

- In-Cab Verbal Driver Coaching
- Crash & Rollover Detection
- GPS Fleet Tracking
- Speed-by-Street™ Technology
- SmartZones
- Idle Monitoring Alerts

WS850 Heavy - Main Hardware Components



WS850 Lite - Main Hardware Components



waySmart™ 850 System Hardware

waySmart™ 850

PART NAME	PART NUMBER	IMAGE
waySmart 850 (WS850) Kit	900-00099	 <p>WS850 Unit RF Shunt</p>

WS850 Installation Kit

PART NAME	PART NUMBER	IMAGE
WS850 Installation Kit <ul style="list-style-type: none"> • WS850 Mounting Bracket • WS850 Tamper Shield • WS850 Installation Hardware • Ignition Sense/Aux Power Cable • Fuse Link (w/ 5 amp fuse) • Assorted Cable Ties • Felt • 3M 3/8" Split Loom 	870-00043	 <p>Installation Kit Installation Kit Contents</p>

WS850 Vehicle Bus Cables

PART NAME	PART NUMBER	IMAGE
OBD-II Vehicle Bus Cable	840-00216	 <p>OBD-II Cable J1708 6-Pin Cable J1939 9-Pin Cable</p>
J1939 (9-Pin) Vehicle Bus Cable	840-00217	
J1708 (6-Pin) Vehicle Bus Cable	840-00218	
16-Pin Vehicle Bus Cable (For Volvo)	340-00229	

WS850 Extension Cables

PART NAME	PART NUMBER	IMAGE
8-Pin Extension Cable (1 meter)	840-00180	 <p>Extension Cable</p>
8-Pin Extension Cable (3 meter)	840-00193	
12-Pin Extension Cable (1 meter)	840-00200	
12-Pin Extension Cable (3 meter)	840-00201	

WS850 Touchscreen Interface Kit

PART NAME	PART NUMBER	IMAGE
WS850 Touchscreen Interface Kit <ul style="list-style-type: none"> HMI200 Touchscreen Interface External GPS Antenna RF Key & Safety Strap Wi-Fi Antenna iButton Key Fob & Key Chain 	900-00085	   <p>HMI200 Touchscreen Unit Touchscreen Kit Contents Seatbelt Sensor Kit</p>
<ul style="list-style-type: none"> SIM Card 	160-00033	

WS850 Add-On Hardware Components

PART NAME	PART NUMBER	IMAGE
WS850 External Seatbelt Sensor Kit	870-00041	 <p>Seatbelt Sensor Kit</p>
Satellite Modem	310-00026	

Recommended Tools & Supplies

Tools & Supplies List		
• Side Cutters	• 40T, 45T, 50T - Torx Bit Set	• Channel Lock Pliers
• 3.5" Square Bit	• 3/4" Hole Punch w/ 7/32" Allen Wrench	• Solder
• 3.5" Phillips Bit	• 12pc Metric 6pt Combination Wrench	• 3/8" - 1/4" Socket Adapter
• 2pc Socket Adapter Set	• 6" Adjustable Wrench	• 9pc Metric Socket Set
• 12" Pry Bar	• Multi-meter	• Butane Torch or Heat Gun
• Fluke TL220	• 1/4" Teardrop Ratchet	• Door Upholstery Remover
• Utility Knife	• 6" Extension Bar (1/4 Drive)	• Cordless Drill/Driver
• 1/4" - 3/4" HSS Step Drill Bit - 9 Steps	• Cable Ties	• Commercial Grade Electrical Tape
• 6" Wobble Extension	• Butane Solder Iron	• 4" Slotted Screwdriver
• 7.32 Hex Key Wrench	• 1/2" x 1/2" Step Drill Bit	• Wire Stripper Cutters
• T20 Security Bit		



Side Cutters



3.5" Square Bit



3.5" Phillips Bit



2pc Socket Adapter Set



12" Pry Bar



Door Upholstery Remover



Cordless Drill/Driver



40T, 45T, 50T - Torx Bit Set



3/4" in. Hole Punch w/ 7/32" Allen Wrench



12pc Metric 6pt Combination Wrench



6" Adjustable Wrench



Multi-meter



Fluke TL220



Utility Knife



Butane Solder Iron



Channel lock Pliers



Solder



3/8" - 1/4" Socket Adapter



9pc Metric Socket Set



Butane Torch



1/4" Teardrop Ratchet



6" Extension Bar 1/4 Drive



Cable Ties



Electrical Tape



6" Wobble Extension



1/4" - 3/4" HSS Step Drill Bit - 9 steps



4" Slotted Screwdriver



7.32 Hex Key Wrench



1/2" x 1/2" Step Drill Bit



Wire Stripper Cutters



T20 Security Bit

WS850 Installation Overview

The WS850 system installation consists of installing all of the necessary hardware components, then programming the system to collect and send data back to the inthinc web portal.

The WS850 system has two main hardware components, the WS850 unit and the HMI200 Touchscreen Interface. It is important to note that the two main hardware components are not dependent upon one another. Based on customer-specific configuration and feature requirements, there may be instances where the WS850 unit is installed, and the HMI200 interface is not.

In addition to the two main hardware components, there are other optional hardware components that may need to be installed, such as the Iridium™ satellite antenna. Each customer installation may vary in terms of which hardware components need to be installed. For example, not every installation will include the satellite antenna. The make and model of the vehicle may also determine what hardware needs to be installed. For instance, certain vehicles will require external seatbelt sensor hardware to be installed in order to detect seatbelt usage.

Installing the WS850 system requires removing vehicle panels, trim, molding, and anything else necessary to install the hardware components and route their cables to the appropriate locations. For assistance removing any vehicle parts, refer to the vehicle owner's manual.

Installation of the Iridium™ satellite antenna may require punching out a hole in the exterior of the vehicle to mount the antenna or to route cables into the cab of the vehicle. Additionally, some installations will require connecting the system to the vehicle constant power source, which may require splicing and routing wires through the engine fire wall and into the cabin. Ensure you have the appropriate tools and supplies required to complete the installation.

The WS850 hardware components do not necessarily need to be installed in any particular order, however it is beneficial to determine where the WS850 unit will be installed before trying to determine how and where to route the various hardware cables. Note: Programming the system to collect and send data to the inthinc portal cannot be completed until all of the hardware components have been installed.

We highly recommend testing all installed hardware components to ensure they are working as intended before replacing any vehicle panels, trim, molding etc. that may have been removed during the installation. Once the system hardware has been tested and is working as expected, it is safe to secure the WS850 unit to the mounting bracket and put the vehicle back together.



STEP 1:	STEP 2:	STEP 3:	STEP 4:
<p>Pre-Installation</p> <ul style="list-style-type: none"> ✓ Planning + Prep ✓ Contact Tech Support ✓ Safety ✓ Installation Checklist 	<p>Install Hardware</p> <ul style="list-style-type: none"> ✓ WS850 Unit ✓ System Power ✓ Satellite Antenna ✓ WS850 Touchscreen 	<p>Program Hardware</p> <ul style="list-style-type: none"> ✓ Send Install Event ✓ Configure Unit ✓ Test Hardware ✓ Test Communication 	<p>Post-Installation</p> <ul style="list-style-type: none"> ✓ Test Drive ✓ Contact Tech Support ✓ Clean Up

Pre-Installation

In This Chapter...

- ▶ **Planning & Preparation** 27
- ▶ **Installation Checklist** 29

This chapter will introduce technicians to what tasks need to be completed prior to installing the WS850 system. Topics include: installation requirements, safety analysis, and the WS850 installation checklist.

Planning & Preparation

1 Installation Requirements

Prior to installing the waySmart™ 850 system, make sure you have met the below installation requirements. These items should be completed prior to arriving at the customer site to complete any installation work.



- Download and review the most recent version of the WS850 Installation Manual to ensure that you have the most up-to-date information on how to install the system. Note: Installation procedures do change from time-to-time, making it imperative to complete this step.
- Ensure you are compliant with any customer or site-specific training and/or safety requirements before entering the customer premises.
- Ensure you have all of the recommended tools and supplies to complete the waySmart installation.

2 Contact inthinc Technical Support

Prior to installing the waySmart™ 850 system, you will need to contact inthinc™ Technical Support to ensure that the vehicle profile and appropriate configuration templates have been created, and you will also need to obtain the Customer ID and Host information, in order to successfully program the WS850 system. When contacting Support, you will need to complete the following:

No.	Step	Description
1	Obtain the Company ID	The Company ID is required for programming the WS850 system post-installation.
2	Obtain the Host URL	The Host URL is required for programming the WS850 system post-installation.
3	Verify the Vehicle Profile exists in the customer portal	The Vehicle profile must be created in the customer portal prior to programming the WS850 system. Vehicle profile must include: Vehicle ID, Make/Model, Year, and VIN #.
4	Verify the Device exists in the customer portal	The Device must exist in the customer portal prior to programming the WS850 system.
5	Verify Vehicle Bus support for Seatbelt compatibility	If Vehicle Bus support is not available for the specific vehicle make and model, you will need to install the external seatbelt sensor hardware.
6	Verify the Vehicle Configuration template has been applied	Verify with the support representative that the Vehicle Configuration template has been applied. If this template has not been applied, the WS850 system may not be programmable post-installation.
7	Verify the Vehicle Bus template has been applied	Verify with the support representative that the Vehicle Bus template has been applied. If this template has not been applied, the WS850 system may not be programmable post-installation.

*When contacting Technical Support, notate the above information on the provided WS850 Installation Checklist. This information will be needed later during the install process.

inthinc™ Support - (866) 294-8637, option 3

3 Conduct Safety Analysis

Safety is an important aspect in everything that we do at inthinc. Safety is also a core value for many of our customers. Before you begin any waySmart installation, consult with the inthinc team lead or the customer site administrator about the following:

- Review and adhere to any and all customer safety requirements and policies while on premises.
- Complete any customer or site-specific training requirements (forms, videos, etc.).
- Ensure you have a clean, safe work environment.
- Ensure you have appropriate Personal Protective Equipment (PPE) such as safety glasses, steel-toe shoes, head gear, etc.



QR Code - Online Checklist
 Scan this QR Code using a QR reader on your mobile phone to complete an online version of this checklist.



Scan this QR Code to complete an electronic version of this form.

Basic Installation Information
 Provide customer, vehicle, device, and technician information.

inthinC				WS850 Installation/Maintenance Checklist			
Installation Type: <input type="checkbox"/> New Install <input type="checkbox"/> Removal/Reinstall <input type="checkbox"/> Swap Out <input type="checkbox"/> Repair				Customer:			
Date:		Time Started:		Time Completed:		Location:	
Company ID:		Host:		Case #			
Vehicle ID:		Mileage:		Orientation #:		Make:	
WS850 S/N #:		Modem S/N #:		HMI200 S/N #:		Model:	
Satellite S/N #:		Satellite IMEI #:		SIM Card #		Year:	
Technician Name:				Certification #:		VIN:	

Pre-Installation Section
 Complete this section of the form prior to installing the waySmart system.

Pre-Installation							
1	Is the waySmart unit to be installed complete with all necessary components? If NO, list missing parts.	YES		N/A		NO	
2	Perform a complete walk around inspection of vehicle? (List any issues in the Notes section)	YES		N/A		NO	
3	Are all interior and exterior lights functioning? Are all factory and after-market equipment functioning? If NO, contact supervisor and get signature.	YES		N/A		NO	
4	Are there any knobs or buttons missing or broken inside vehicle? Any trim or molding missing or broken? If YES, contact supervisor and get signature.	YES		N/A		NO	
5	Was any other monitoring system removed that may have been in vehicle? (If so, list in the Notes section)	YES		N/A		NO	
6	Use a multi-meter to measure the Static and Dynamic Voltage at the Vehicle Diagnostic Port and record the results. (Refer to "WS850 Power Installation" section of the WS850 Installation Manual)		Static Voltage			Dynamic Voltage	
Notes:							

Installation Section
 Indicate what hardware components were installed and the location for various power components.

Installation							
1	Indicate which hardware components were installed:	WS850	HMI200	Speaker	Modem	iButton	Sat.
2	Indicate which Vehicle Bus Cable was used:	OBD-II	6-Pin	9-Pin			
3	Indicate where the Constant Power was connected (When not obtained from the Vehicle Diagnostic Port):	Battery	Power Post	Upfitter Connection	Other:		
4	Indicate where the Switched Ignition Power was connected: Fuse #:	Cab Fuse Box	Eng. Fuse Box	Upfitter Connection	Other:		

Post-Installation Section
 Complete this section of the form after installing and programming the waySmart system.

Post-Installation							
1	Are the antennas secure and tight and in their proper location?	YES		N/A		NO	
2	Have all electrical connections been hard wired with provided solder sleeve connectors or soldered and heat shrunk?	YES		N/A		NO	
3	Are all cables neatly wrapped, secured with zip ties and tucked away from any moving components on the vehicle? (i.e. parking brake cable, steering column, etc...)	YES		N/A		NO	
4	Are all of the vehicle components still working properly? (i.e. radio, windshield wipers, heater, a/c, cb radio, power windows, etc...)	YES		N/A		NO	
5	Was the vehicle taken for a test drive to test hardware functionality, as per the Installation Manual? Any issues? (List below)	YES		N/A		NO	
6	Does the waySmart system have GPS lock?	YES		N/A		NO	
7	Has the vehicle been completely reassembled?	YES		N/A		NO	
8	Call inthinC Technical Support (866-294-8637, opt. 3) to verify the following: Technical Support Case #:	Install Event		Vehicle Config. Template		Vehicle Bus Template	
9	[For Supervising Official] Does the quality of this installation meet or exceed your expectations?	YES		N/A		NO	
10	Any problem with the installation? If so, detail here (include RMA number, if applicable):						

Customer Signature
 After the installation is complete, review the checklist with the customer and obtain their signature.

Inspected By Print: _____	Date: _____
Inspected By Signature: _____	Date: _____
Customer Signature: _____	Date: _____

Give a copy to customer; Keep a copy; then Scan and Email, or Fax a Copy to INTHINC: Attn: Field Operations; install-record@inthinC.com Fax # 801-606-7222

P/N# 770-00045 (Rev B)

Send Checklist to inthinC
 Follow the instructions on the form to send the completed checklist to inthinC.

Installation Checklist

All technicians must complete the Installation Checklist for each new waySmart installation performed. Completed forms must be faxed to inthinc for internal review. The Installation Checklist captures important device and vehicle information, and in some cases serves as the bill of labor for work completed.



Important Note:

Technicians can scan the QR Code (with a QR Reader from a mobile phone) on the checklist and complete an online version of this checklist rather than filling out and faxing the hard-copy checklist to inthinc. Note: You must have a compatible smart phone with a QR Reader application installed to scan QR Codes.

▼ Complete the Installation Checklist as follows:

1. Locate the Installation Checklist, which can be found in the waySmart Installation Kit.
2. Complete the checklist as you are installing the waySmart system. See Image on page 28, and Table 1 below for more information.
3. Review Checklist with customer and obtain customer signature ensuring work was completed and meets customer expectations.
4. Provide customer with carbon copy of the completed and signed form.
5. Scan and E-mail (install-record@inthinc.com), or fax (801-606-7222), the completed and signed form (white carbon copy) to inthinc. Note: You can also complete this form electronically by scanning the QR code on the checklist and completing the online form.
6. Retain the completed form for your records.

Table 1 - WS850 Installation Checklist

No.	Item	Description
Basic Installation Information Section		
1	Installation Type	Indicate the type of work being performed from the available options.
2	Date, Time Started, Time Completed	Indicate the date the work is being performed, including the start and end times.
3	Company ID	Indicate the Company ID used when programming the WS850 system.
4	Host	Indicate the Host information used when programming the WS850 system.
5	Vehicle ID	Indicate the Vehicle ID number that the WS850 system is being installed in.
6	Mileage	Log the current vehicle mileage from the odometer.
7	Orientation #	Indicate the Orientation # used when programming the WS850 system.
8	WS850 S/N# (Serial Number)	Indicate the WS850 unit's serial number, which can be found on the WS850 unit label.
9	Modem S/N# (Serial Number)	Indicate the GPRS Modem serial number, which can be found on the modem label.
10	Touchscreen (HMI200) S/N# (Serial Number)	Indicate the WS850 Touchscreen serial number, found on the Touchscreen label.
11	Satellite S/N# (Serial Number)	Indicate the WS850 Satellite Antenna serial number, found on the Satellite Antenna.
12	Satellite IMEI #	Indicate the Satellite Antenna IMEI number, found on the Satellite Antenna.
13	SIM Card #	Indicate the GPRS (Cellular) SIM Card Number, found on the SIM Card.
14	Technician Name	The technician that is completing the work/installation of the WS850 system.
15	Certification #	Indicate the Certification number for the technician completing the work.
16	Customer	Customer who the work is being performed for.
17	Location	Customer location (City, State)
18	Case #	Indicate the Technical Support Case # in this field.
19	Model, Make, Year	Indicate the Make, Model and Year for the vehicle being worked on.
20	VIN	Indicate the Vehicle VIN number (17 digits)
Pre-Installation Section		
1	Is the waySmart unit to be installed complete with all necessary components?	Indicate whether or not all required hardware was included in the WS850 kit. If No, list any missing components in the "notes" section.
2	Perform a complete walk around inspection of the vehicle?	Indicate whether an inspection was performed or not. If there are any issues found, note them in the "notes" section.
3	Are all interior and exterior lights functioning? Are all factory and after-market equipment functioning?	Indicate if there is any non-functioning equipment, and if yes, notify a supervisor and get their acknowledgement.
4	Are there any knobs or buttons missing or broken inside vehicle? Any trim or molding missing or broken?	Indicate if there are any missing vehicle parts, and if yes, notify a supervisor and get their acknowledgement.
5	Was any other monitoring system removed that may have been in the vehicle?	Indicate if any other monitoring equipment was removed from the vehicle prior to installation of the WS850 system.
6	Use a multi-meter to measure the Static and Dynamic Voltage at the Vehicle Diagnostic Port and record the results.	Indicate the current vehicle Static and Dynamic voltage and ensure the vehicle electrical system is in good health prior to installing the WS850 system.

No.	Item	Description
Installation Section		
1	Indicate which hardware components were installed	Indicate which hardware components were installed from the available options.
2	Indicate which Vehicle Bus Cable was used	Indicate which of the available Vehicle Bus cables were used for the installation.
3	Indicate where the Constant Power was connected	Indicate how the Constant power was connected from the available options.
4	Indicate where the Switched-Ignition Power was connected	Indicate what method was used to connected switched-ignition power. If connected to a fuse, indicate the fuse # used.
Post-Installation Section		
1	Are the antennas secure and tight and in their proper location?	Indicate whether or not the antenna installation meets inthinc quality standards and is installed in the correct location.
2	Have all electrical connections been hard wired with provided solder sleeve connectors or soldered and heat shrunk?	Indicate whether or not the power installation meets inthinc quality standards and all electrical connections are secure and safe for operation.
3	Are all cables neatly wrapped, secured with zip ties and tucked away from any moving components?	Indicate whether or not cable routing and bundling meets inthinc quality standards.
4	Are all of the vehicle components still working properly?	Indicate whether or not all vehicle components are working they way they did prior to the installation work being performed.
5	Was the vehicle taken for a test drive to test hardware functionality, as per the Installation Manual? Any Issues?	Indicate whether or not the vehicle was taken for a test drive post-installation. If yes, indicate any issues experienced in the "notes" section.
6	Does the waySmart system have GPS lock?	Indicate whether or not the WS850 system working GPS by validating the system has GPS lock.
7	Has the vehicle been completely reassembled?	Indicate whether or not the vehicle was completely reassembled the way it was before performing the installation.
8	Call inthinc Technical Support to verify the following:	Indicate on the checklist what information has been verified when contacting technical support. Document the support case number on the Installation Checklist.
9	[For Supervising Official] Does the quality of the installation meet or exceed your expectations?	Have a supervisor inspect the WS850 system installation and get their acknowledgement that the system was installed per their expectations.
10	Any problem with the Installation?	Indicate any problems encountered with the installation here. If parts have to be RMA'd, indicate the RMA number here.



Using QR (Quick Response) Codes

QR Codes are used to store and transmit data, similar to a barcode. You can use them by scanning them with your mobile phone. You will need to have a "QR Reader" application installed on your mobile phone to read these codes.

To use the QR code, simply scan the code using your mobile phone and you will be directed to a web page that will contain information, such as a video tutorial, work instructions, or in this case an online form.

For more information about QR Codes, visit - <http://www.mobile-qr-codes.org/qr-codes.html>



Example of QR Code

WS850 Hardware Installation

In This Chapter...

- ▶ **Where to Install WS850 Unit** **34**
- ▶ **How to Install WS850 Unit** **34**
- ▶ **How to Connect Components** **35**
- ▶ **How to Route Cables** **36**

This chapter will provide technicians with work instructions on where and how to install the WS850 unit, including the tamper shield and mounting bracket, and how to connect the various hardware components to the WS850 unit.

WS850 Unit Installation Process

The first step in the installation process is to determine where and how to install the WS850 unit. The WS850 unit must be installed in the cab of the vehicle, however the installation location will vary depending on the make and model of the vehicle. The most common installation locations are under or behind the front driver/passenger seat, under the rear seats, or on the back wall of the cab. After determining where to mount the unit, you will install the WS850 mounting bracket.

This section will provide work instructions for the following:

- Where to install the WS850 unit
- How to install the WS850 mounting bracket
- How to connect hardware components to WS850 unit
- How to secure WS850 unit to the mounting bracket and install the Tamper Shield



Things to Consider when Installing the WS850 Unit:

- Unit must be installed inside the cab of the vehicle.
- Unit must be mounted and installed on a horizontal (0°) or vertical (90°) surface.
- Mounting bracket should be installed in a location where there is enough clearance to attach the WS850 unit to the bracket.
- Before installing the mounting bracket, check under the vehicle, or behind the mounting surface to ensure that mounting hardware (screws) do not interfere with or penetrate any vehicle components such as the fuel tank, hydraulic lines, electrical components, etc.
- Ensure that the unit, once installed, will not interfere with the normal movement of vehicle parts, such as adjusting the seat.
- Allow enough space to install the WS850 hardware, peripheral cables, and the tamper shield.

WS850 Hardware at a glance:



WS850 Unit (Top)



WS850 Unit (Back)



WS850 Unit (Front)



WS850 Unit Tamper Shield



WS850 Unit Mounting Bracket



WS850 Installation Kit



WS850 Installation Hardware
(included in Installation Kit)

1 Determine WS850 Installation Location

Determining the location to install the WS850 device will be the first step of the hardware installation process, prior to installing any of the peripheral hardware components. Common installation locations may be under or behind the front driver/passenger seat, under the rear seats, or on the rear wall of the cab.

After determining where to install the unit, it is safe to install the mounting bracket, however do not secure the WS850 unit to the mounting bracket until all other hardware components have been installed and connected to the WS850 unit.

▼ Examples of WS850 Installation Locations:



2 Installing the WS850 Mounting Bracket

The WS850 was designed to be easily serviceable and easily installed. A metal mounting bracket has been designed so that the bracket attaches securely to the vehicle body/frame and the WS850 unit attaches securely to the mounting bracket.

▼ Installation Process:

1. Locate where you are going to install the WS850 mounting bracket and mark the location. Note: Check under the vehicle, and around the installation location to ensure that the mounting bracket hardware (screws) will not interfere with any vehicle components when installed.
2. Install the WS850 mounting bracket as follows:
 - a. Note: Mounting bracket must be installed on a flat surface.
 - b. Use at least four (4) mounting screws, one at each corner of the mounting bracket, to ensure the unit is stable when installed. Secure the bracket one side at a time to prevent buckling in the center.
 - c. Do not overtighten or torque down the mounting bracket when securing to the vehicle, as this will cause the bracket to flex and bend to a point where it may be difficult to attach the WS850 unit to the mounting bracket. Use risers or spacers if necessary to raise the mounting bracket off the floor to prevent this from happening.
3. Do not attach the WS850 unit to the mounting bracket until all other hardware components have been installed, with cables routed and connected to the unit.



3 Connect Hardware Components

The WS850 was designed to be modular. Some of the hardware connection ports have been reserved for future use, and are not used at this time. All connections not used, should have the appropriate covers installed.

▼ Installation Process:

1. Connect the RF Shunt to the RF SW input on the WS850 unit.
2. Connect each of the applicable hardware cables to the WS850 unit. Refer to Table 2 below for more information about hardware inputs. Note: Ensure that cable connections are tightly secured to the WS850 unit.
3. After all hardware cables have been connected to the WS850 unit, it is safe to route the cables to where the applicable hardware components will be installed, see the next step for more information on cable routing.

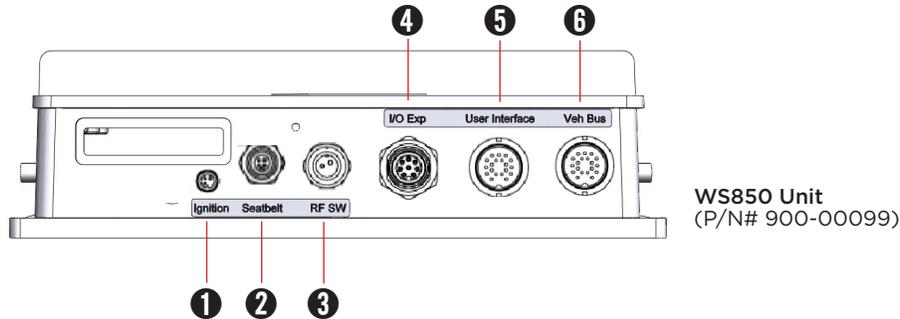


Table 2 - WS850 (900-00099) Hardware Connections

NO.	INPUT	DESCRIPTION	REQUIRED?
1	Ignition	Connect the Ignition Sense / Aux Power cable to this input. This cable provides the Ignition Sense, Tamper Detect Sense, and an alternate source for Constant/Ground when the Vehicle Bus Cable is not used.	Yes
2	Seatbelt	Connect the GPIO External Seatbelt Sensor to this input. This cable provides an alternate means of collecting seatbelt usage data and is only used when the Vehicle Bus is not compatible for seatbelt support.	Optional
3	RF SW	Connect the RF Shunt to this input. The RF Shunt is included in the box with the WS850 unit. Note: The RF Shunt must always be connected to this input.	Yes
4	I/O Exp	This input is used for future expansion of inthinc technology and third-party peripherals. The input is not currently used. Place cap over this input.	No
5	User Interface	Connect the Touchscreen extension cable to this input. This cable provides usability and functionality of the Touchscreen (HMI200) User Interface.	Yes
6	Vehicle Bus	Connect the appropriate Vehicle Bus Cable (OBD, 9-Pin, 6-Pin) to this input. This cable provides for the WS850 system to collect valuable data from the vehicle's computer system. This cable also supplies the WS850 its primary power supply.	Optional

Note: The pins of each peripheral connector are small and could easily be damaged. Check each connector for proper keyed direction prior to connecting. Failure to do so may result in improper function or damage to the device.

4 Route Hardware Cables

Proper wire routing is essential to the waySmart's long-term reliability. Improper wire routing can lead to many different electrical malfunctions and repairs. Failure to follow these guidelines may result in voiding the product warranty.

Minimum Wire Routing Standards	
Location:	<ul style="list-style-type: none"> Route wiring so that it does not come into contact with any of the vehicles moving parts (i.e. seat adjusters, sunroofs, brake and clutch pedals, glove box, etc.) Be sure to keep all wiring away from radiant heat sources. Where possible and practical, install wiring inside the cab of the vehicle. If exterior wiring is necessary, make sure it is adequately protected. Route wires in and through areas where they are least vulnerable to damage from subsequent assemblies. Route wiring away from potentially damaging vehicle surfaces, such as sharp objects, raw sheet metal, sharp metal flanges, etc. Any wiring routed through raw metal surfaces will have the appropriate sized rubber grommet or hoe edge protector installed. Taping the raw metal edge is not an acceptable means of protection. Wires will be routed so that they do not hang down around pedals or in areas that can be contacted by either driver or passenger foot movement.
Tension:	<ul style="list-style-type: none"> Route wires to avoid tension and allow some slack between two fixed attached points, such as clips, clamps, connectors, and grommets.
Appearance:	<ul style="list-style-type: none"> All cables routed within the cab of the vehicle, should be visually hidden from the customers normal line of sight. All wiring that cannot be hidden should be covered with black conduit.

▼ Installation Process:

- If not already done, remove all vehicle trim, panels, and molding necessary for cable routing.
- After all appropriate cables have been connected to the WS850 unit, use cable ties and secure all of the cables together and route to the front of the vehicle (i.e. under the steering column). This will make it easier to connect each of the installed hardware components (i.e. Touchscreen, Power, etc.) to the applicable cable.

Note: When securing cables using cable ties, leave enough slack to allow for the WS850 unit to be removed and reinstalled in the mounting bracket.

- When routing the hardware cables to the front of the vehicle, try to utilize existing wire routing paths whenever possible.



Route cables from the WS850 unit to the front of the vehicle.



Use existing wire routing paths whenever possible. Ensure the cables are routed in a professional manner.



Secure and tuck away cables so they do not interfere with normal vehicle operation.

5 Secure WS850 to Mounting Bracket

▼ Installation Process:

1. **Note:** Do not secure WS850 to the mounting bracket until all hardware components have been installed and connected to the WS850 unit.
2. Secure the WS850 to the mounting bracket as follows:
 - a. Place the WS850 unit into the mounting bracket by aligning the four (4) prongs on the WS850 unit with the grooves on the mounting bracket and press downward to fit the unit into the mounting bracket. (See *image below*)
 - b. Once the WS850 unit is in the mounting bracket, slide the unit forward to lock the unit into the grooves on the mounting bracket.
3. Using the hardware provided in the installation kit, Insert two (2) security screws into the side of the WS850 unit, through the mounting bracket to secure the WS850 unit into the mounting bracket. (See *image below*)



Place WS850 unit into the mounting bracket and ensure it seats properly into the bracket.



After all hardware components have been installed and connected to the WS850 unit, use the provided hardware to secure the unit to the mounting bracket.



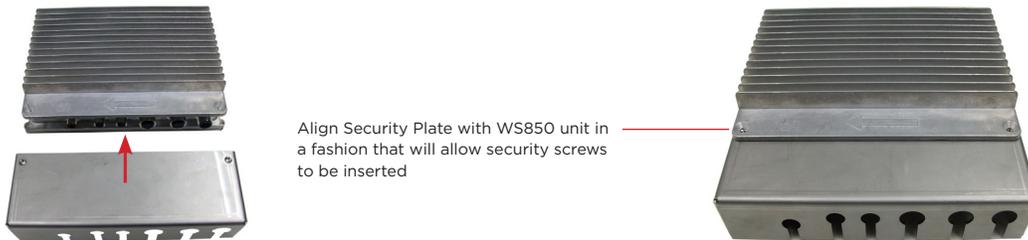
WS850 unit secured to the mounting bracket with cables protruding towards the rear of the vehicle. Note: Security plate is not installed yet.

6 Secure WS850 Tamper Shield

Tampering from drivers and unauthorized technicians will continue to be the easiest way to undermine the waySmart system. For this reason, customers have requested ways to deter such attempts. The WS850 Tamper Shield has been designed to protect the waySmart cables from damage and negate accessibility for potential tampering. The WS850 Tamper Shield is attached to the mounting bracket using specialized anti-tamper screws to prevent accessibility without the proper tools.

▼ Installation Process:

1. Note: Do not complete this step until all hardware is installed, programmed, and tested to ensure the system is working as intended.
2. Slide the security plate (tamper shield) over the cable connections on the WS850 unit and align the screws holes on the security plate with the holes on the WS850 unit. Note: The security plate fits just under the top edge of the WS850. (See image below)
3. Locate the security screws included with the installation kit, insert the screws into the WS850 unit through the security plate, then use a T-20 security bit and tighten down the screws until secure.



Important Information

There are two different versions of the WS850 hardware (P/N# 900-00068 & 900-00099). Hardware cables are not compatible between the two versions of WS850 units. If there is ever a need to replace a hardware component for the WS850 system, it will be important to get a replacement for the correct version of WS850 unit that is installed. If no replacement parts are available, the WS850 unit may need to be replaced to accommodate the type of cables being used.

For assistance with replacement parts, or if you have any questions about what parts are required, please contact inthinc Technical Support at 1 (866) 294-8637 opt. 3, or E-mail support@inthinc.com.

WS850 Power Installation

In This Chapter...

- ▶ **WS850 Power Overview** 41
- ▶ **Vehicle Bus Cable Installation** 43
- ▶ **Switched-Ignition Connection** 45
- ▶ **Tamper Detect Sense Connection** 47
- ▶ **Direct Constant & Ground Connection** 47
[When Required]

This chapter will provide technicians with work instructions on where and how to install and connect WS850 system power. Topics include, how and where to connect power and how to connect the Vehicle Bus cable to the vehicle data link connector (diagnostic port).

WS850 Power Overview

The power supply to the WS850 system is one of the most important parts of the installation process. Ensuring that the WS850 is connected to the vehicle's constant power system, switched-ignition sense, and proper chassis ground, is one of the most critical steps.

The WS850 has been designed to accept constant voltage sources ranging between 12VDC and 24VDC, without the need for a relay or power converter. The WS850 will receive its primary constant power source and ground from the Vehicle Bus (diagnostic) port. It is imperative that the Vehicle Bus be properly tested to ensure that both (constant and ground) pins are reliable (see Table 3, on page 44). In addition to installing the WS850 Vehicle Bus cable, the Ignition Sense/Aux Power cable (Red Wire) will need to be installed and an acceptable and reliable ignition source will need to be identified. The Ignition Sense/Aux Power cable also has a Tamper Detection signal wire (Green Wire) that will be connected to an approved factory chassis ground location.

This section will provide installation instructions on how to install the appropriate Vehicle Bus cable and Ignition Sense/Aux Power cable as well as assist the technician when interfacing electrical connections to the vehicle's OEM wiring system. Improper electrical connections can result in failures of both the waySmart™ and vehicle electrical system.



When interfacing with the vehicle OEM electrical system, follow these guidelines:

- Never cut into an OEM wire. Alternate methods such as Customer Access Circuits, electrical convenience centers, power posts, and battery studs are available to gain access to the OEM circuits.
- Always incorporate a circuit protection device (fuse) to all circuits added to the vehicle.
- Never replace OEM fuses with fuses of a higher rating.
- Do Not use quick-splice, scotch lock, wire nuts or similar splicing devices.
- Hand crimp terminals and splices alone are not acceptable means of connection. If it is necessary to crimp terminals by hand, they should also be soldered to the wire to ensure a reliable electrical connection.
- Cover all splices with heat-shrink tubing.

Vehicle Bus Cable Installation

The WS850 system must be connected to the vehicle OBD-II/CAN diagnostic port connection. This connection will provide the WS850 with its primary source of constant power and ground. Vehicle Bus connectivity also allows the device to collect important information directly from the vehicle computer. To accommodate installation in various vehicle makes, models, and years, there are three (3) different Vehicle Bus cable options available (See table below).

CABLE	PART NO.	VEHICLE TYPE	IMAGE
OBD-II Vehicle Bus Cable	P/N# 840-00216	Light-Duty	
J1939 (9-pin) Vehicle Bus Cable J1708 (6-pin) Vehicle Bus Cable	P/N# 840-00217 P/N# 840-00218	Heavy-Duty Heavy-Duty	

▼ Installation Process:

1. Locate the vehicle's OBD-II/CAN diagnostic port, typically found within 2 ft. of the steering column for most vehicles.
2. Using a multi-meter, test the appropriate pins at the diagnostic port for 12v constant power and ground (see Table 3 on next page). If the diagnostic port does not provide constant power or ground, the system will need to be connected directly to the vehicle power and ground source. (See Direct Constant Power & Ground Connection, on page 47).



Important Note:

When connecting the WS850 directly to vehicle power and ground sources when no power/ground is available at the diagnostic port, DO NOT install or connect the Vehicle Bus cable.

3. Remove any vehicle panels, trim, or molding necessary for cable routing.
4. Connect the Vehicle Bus cable to the "Vehicle Bus" input on the WS850 unit and ensure the connection is secure.
5. Route the Vehicle Bus cable from the WS850 unit, to the front of the vehicle (driver-side) where it can be connected to the diagnostic port. Cable routing will vary depending on the placement of the WS850 unit and the type of vehicle. **Note:** There is an extension cable available (1-meter or 3-meter) to extend the length of the Vehicle Bus cable when needed.
6. Route the Vehicle Bus cable under the dash or behind dash panels where it can be connected to the vehicle diagnostic port.
7. Neatly wrap and secure any excess cable behind or under the vehicle dashboard, so it will not interfere with any vehicle components.
8. Plug the Vehicle Bus cable into the vehicle diagnostic port and ensure the connection is secure. Use cable ties if necessary.



Locate the vehicle diagnostic port (OBD-II/CAN).

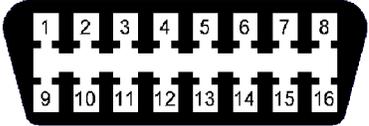
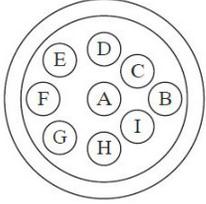
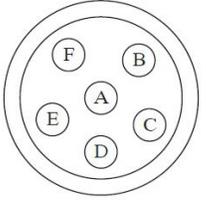


Connect the Vehicle Bus cable to the diagnostic port.



Secure any excess cable so that it will not interfere with any vehicle components.

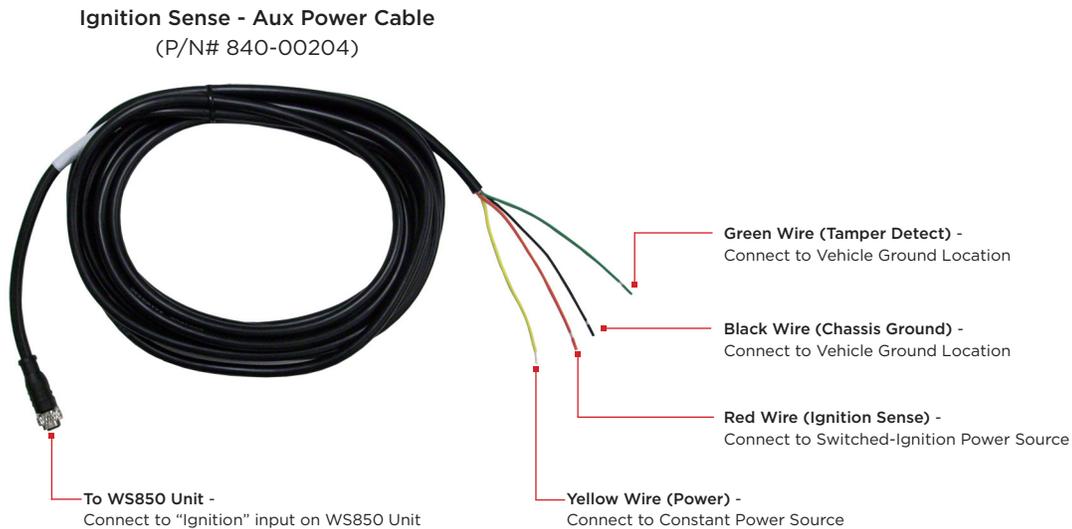
Table 3 - Diagnostic Port Power/Ground Testing

TYPE	INSTRUCTIONS	PINOUT DIAGRAM
OBD-II	<p>Test for Constant Power by completing the following: Using a multi-meter, test for 12V constant power by checking PIN 16 on the OBD-II port while also touching a factory ground location. You should see 12V power with the ignition on or off.</p> <p>Test for Ground by completing the following: Using a multi-meter, test for 0V ground by checking PIN 4/5 at the OBD-II port while also touching a factory ground location. You should see 0V power with the ignition on or off.</p>	 <p>Pin 4 or 5 - Ground Pin 16 - Power (12V)</p>
J1939 (9-Pin)	<p>Test for Constant Power by completing the following: Using a multi-meter, test for 12V constant power by checking PIN B at the 9-pin diagnostic port while also touching a factory ground location. You should see 12V power with the ignition on or off.</p> <p>Test for Ground by completing the following: Using a multi-meter, test for 0V ground by checking PIN A at the 9-pin diagnostic port while also touching a factory ground location. You should see 0V power with the ignition on or off.</p>	 <p>Pin A - Ground Pin B - Power (12V)</p>
J1708 (6-Pin)	<p>Test for Constant Power by completing the following: Using a multi-meter, test for 12V constant power by checking PIN C at the 6-pin diagnostic port while also touching a factory ground location. You should see 12V power with the ignition on or off.</p> <p>Test for Ground by completing the following: Using a multi-meter, test for 0V ground by checking PIN E at the 6-pin diagnostic port while also touching a factory ground location. You should see 0V power with the ignition on or off.</p>	 <p>Pin C - Power (12V) Pin E - Ground</p>

Switched-Ignition Source Connection

In order to minimize interference with the OEM electrical systems, the WS850 has been designed to be functionally separate from the OEM electrical system. This helps to prevent potential failures and/or damage to the OEM electrical system in the event there is a device failure. You may need to test multiple Switched-Ignition source locations before finding a true switched ignition. The Switched-Ignition source must have power when the vehicle key is in the “run” position and no power (<0.07 VDC) when the vehicle key is in the “off” position.

Typically, light-duty truck manufactures (Ford, Chevrolet) and heavy-duty truck manufactures (Kenworth, Peterbilt, International, etc.) provide either a Body-Builders Junction Block or a number of conveniently located electrical wiring taps and connection points. Most taps and connections are fused, having locations under the instrument panel or in the engine compartment. These connection points are powered by direct battery and ignition-controlled circuits. Circuit protection should be added within 18” inches of the wire’s length from the connection point. (See table below)

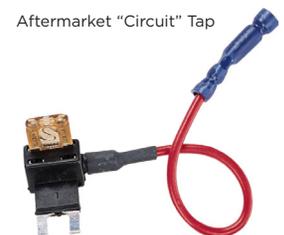


Customer Access Circuits			
Year	Make	Model	Customer Access Circuit
2004-2009	Ford	F-250/350/450/550	Circuit no. CBP44 Wire Color: Purple (connection available for Switched-Ignition only) - A fused 10 amp circuit - Found: Blunt-cut & taped, on the harness behind the Diagnostic Link Connector
2010-Current	Ford	F-250/350/450/550	Circuit no. CDC64 Wire Color: White/Blue (connection available for Switched-Ignition only) - A fused 5 amp circuit - Found: in cab under driver’s side instrument panel near engine bulkhead
2007-2013	Chevrolet/GMC	Silverado/Sierra 1500/2500/3500	IECM Electrical Connector (P/N# 840-00158 Rev. B) - Found: Under the IECM cover behind the Diagnostic Link Connector - Connections available for Constant, Switched-Ignition, and Ground - See page 48 for more information
All	Kenworth	Heavy Truck	Spare Circuit Bullet Connectors - Found: behind gauge panel, remove the LH gauge panel above ignition key switch - Connections available for Constant, Switched-Ignition, and Ground

Note: inthinc provides the minimum acceptable splice and ring terminal connectors. Each Installation Kit (P/N# 870-00043) contains multiple gauge solder/heat shrink and ring terminals.

If a vehicle is not supplied with a Customer Access Circuit, it may be necessary to tap an existing circuit at the vehicle fuse panel. A brass fuse tap has been included in the installation kit, that when soldered to the Ignition Sense/Aux Power Cable (Red Wire), allows for a signal to come from the “hot” or powered side of an existing Switched-Ignition fuse circuit.

inthinc prefers the use of an aftermarket Fuse Tap or Circuit Tap. The “Circuit Tap” is available from multiple automotive parts stores and allows for the least invasive means to add a circuit to a vehicle.



▼ Installation Process (Using Fuse/Circuit Tap):

- Using a multi-meter, locate an acceptable ignition sense source (i.e. Fuse) at the OEM Fuse panel. A Switched-Ignition fuse will have power when the key is in the "On" position, and no power (<0.07 VDC) when the key is in the "Off" position.



Important Note:

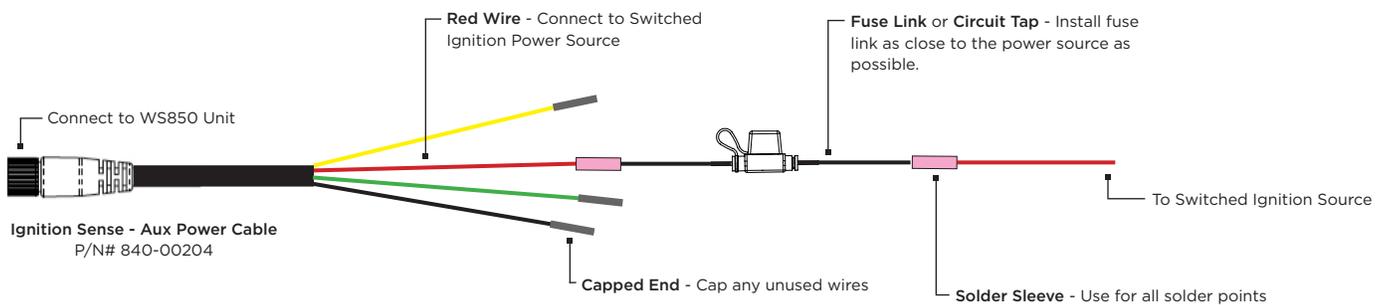
DO NOT USE any fuse circuit relating to the Powertrain Control System, Transmission Control System, Fuel Control System, Stability/ABS Control System, or Air Bag Control. Use of these systems could adversely affect the electrical system operation.

- Locate the Ignition Sense/Aux Power cable provided in the hardware installation kit. The 12ft. Ignition Sense/Aux Power cable will have four (4) separate wires protruding from one end, which will be connected to the power and ground source locations, and a socket connector at the opposite end which will be connected to the WS850 unit. (See wiring diagram below)
- Remove any vehicle panels, trim, or molding necessary to route the cable.
- Route the Ignition Sense/Aux Power cable from the WS850 unit, to the front of the vehicle (driver-side) where it will be easy to connect the wires to the appropriate power and ground source locations.
- Connect the Ignition Sense/Aux Power cable to the vehicle Switched-Ignition power source as follows:
 - Locate the Red (Switched-Ignition) power wire on the Ignition Sense/Aux Power cable and determine how much additional wire may be needed to reach the Switched-Ignition power source.
 - Splice the additional wire (if needed) to the Red (Switched-Ignition) power wire on the Ignition Sense/Aux Power cable using the provided solder sleeve. Ensure the solder connection is secure. (See wiring diagram below)
 - Route the Red (Switched-Ignition) power wire to where it can be connected with the vehicle switched-ignition power source.
 - Locate a fuse link and splice one end of the fuse link with the Red (Switched-Ignition) power wire using a solder sleeve. Ensure solder connection is secure.
 - Connect the Red (Switched-Ignition) power wire (with the fuse link attached) to the vehicle's switched-ignition power source using a brass fuse tap. The fuse link should be installed as close to the power source as possible.

Note: To eliminate potential surges in the system, ensure that the 5 AMP fuse is installed after connecting the power components, but prior to starting the vehicle post installation.

Note: If using an aftermarket "Circuit" tap, you will not need to use the fuse link, however you will need to ensure that a fuse is properly inserted into the circuit tap.

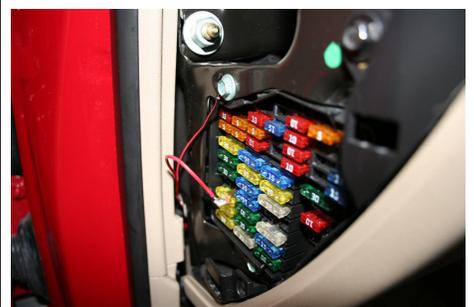
- Neatly wrap and secure any excess cable and hide under the dash or wherever appropriate.



Use either a "Circuit tap" or solder a "fuse tap" to connect the switched-ignition cable to the source.



Switched-Ignition cable connected to "circuit tap" connected to a fuse in the fuse box.



Switched-Ignition cable connected to switched-ignition source fuse with a fuse tap in the fuse box.

Direct Constant Power, Ground & Tamper Detect Connection [When Necessary]

As mentioned previously, light-duty truck manufactures (Ford, Chevrolet, etc.) and heavy-duty truck manufactures (Kenworth, Peterbilt, International) provide either a Body-Builders Junction Block or a number of conveniently located electrical wiring taps and connection points. Most taps and connections are fused, having locations under the instrument panel or in the engine compartment. These connection points are powered by direct battery and ignition-controlled circuits. Circuit protection should be added within 18" inches of the wires length from the connection point. (See table below)

If a vehicle is not supplied with a Customer Access Circuit, then a proper Ground and Constant power circuit will need to be accessed. Refer to the installation instructions that follow on pages 50-51.

Customer Access Circuits			
Year	Make	Model	Customer Access Circuit
2007-2013	Chevrolet/GMC	Silverado/Sierra 1500/2500/3500	IECM Electrical Connector (P/N# 840-00158 Rev. B) - Found: Under the IECM cover behind the Diagnostic Link Connector - Connections available for Constant, Switched-Ignition, and Ground - See page 50 for more information
All	Kenworth	Heavy Truck	Spare Circuit Bullet Connectors - Found: behind gauge panel, remove the LH gauge panel above ignition key switch - Connections available for Constant, Switched-Ignition, and Ground



Grounding Guidelines:

- inthinc provides tin-coated brass alloy ring terminals with a solder core and heat shrink. They are the minimum acceptable standard ring terminals and are included with each Installation Kit (P/N# 870-00043).
- Hand crimp terminals alone are not acceptable means of connection. If it is necessary to crimp terminals by hand, they should also be soldered to the wire to ensure a reliable electrical connection.
- Use only OEM provided chassis ground studs or connectors.
- Choose Ground fasteners that are also plated for corrosion resistance.
- Make sure that all grounding surfaces are clean and free of paint, sealers, and non-conductive materials.
- DO NOT USE rivets or sheet metal screws to establish a ground connection.



Constant Power Guidelines:

- Never cut into an OEM wire. Alternate methods such as Customer Access Circuits, electrical convenience centers, power posts, fuses, and battery studs are available to gain access to the OEM circuits.
- Always incorporate a circuit protection device (fuse) to all circuits added to the vehicle.
- Vehicle batteries emit a small amount of gas during the normal charge/discharge cycle of a battery. This process is called "off-gassing" and is extremely corrosive. Only connect the WS850 constant power directly to the battery, when no other option is available.

Tamper Detect Sense Wire Connection

The WS850 has been designed with a means of capturing a signal each time the Vehicle Bus Cable is removed (unplugged). While the Tamper Detect Sense wire is not a Ground for the WS850, it will need to be connected to a factory approved vehicle chassis ground location.

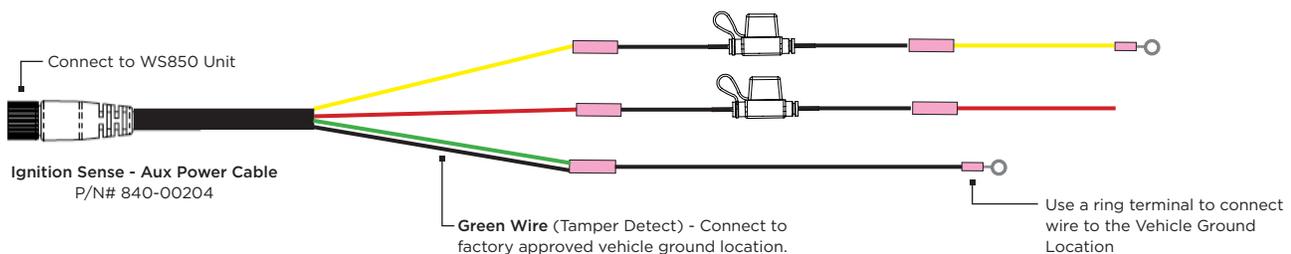


Grounding Guidelines:

- inthinc provides tin-coated brass alloy ring terminals with a solder core and heat shrink. They are the minimum acceptable standard ring terminals and are included with each Installation Kit (P/N# 870-00043).
- Hand crimp terminals alone are not acceptable means of connection. If it is necessary to crimp terminals by hand, they should also be soldered to the wire to ensure a reliable electrical connection.
- Use only OEM provided chassis ground studs or connectors.
- Choose Ground fasteners that are also plated for corrosion resistance.
- Make sure that all grounding surfaces are clean and free of paint, sealers, and non-conductive materials.
- DO NOT USE rivets or sheet metal screws to establish a ground connection.

▼ Installation Process:

1. Remove any vehicle panels, trim, or molding necessary for cable routing and location of a Vehicle Chassis Ground.
2. Locate the vehicle ground location that will be used.
3. Locate the Ignition Sense/Aux Power Cable provided in the hardware installation kit.
4. Route the Ignition Sense/Aux Power Cable from the WS850 unit, to the front of the vehicle (driver-side) where it will be easy to connect the Green Wire to the appropriate Ground location.
5. Connect the Ignition Sense/Aux Power Cable to the vehicle Ground location as follows:
 - a. Locate the Green (Tamper Detect) wire on the Ignition Sense/Aux Power cable and determine how much additional wire will be needed to reach the vehicle ground location.
 - b. Splice the additional wire with the Green (Tamper Detect) wire on the Ignition Sense/Aux Power cable using the provided solder sleeve. Ensure the solder connection is secure. (See wiring diagram below)
 - c. Route the Green (Tamper Detect) wire to where it can be connected with the vehicle ground location.
 - d. Connect a provided ring terminal, using a solder sleeve, to the end of the wire that you will be connecting to the ground source.
 - e. Connect the (Ground) wire to the vehicle factory ground location and ensure the connection is secure. (See image on next page)
6. Neatly wrap and secure any excess cable and hide under the dash or wherever appropriate.

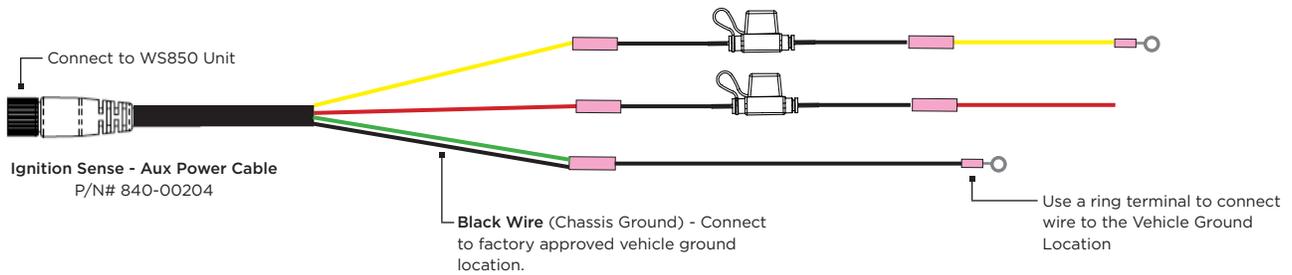


Ground Wire Connection

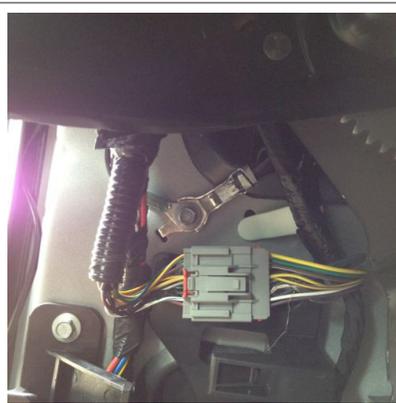
When the WS850 system cannot get primary power/ground from the Vehicle Bus cable, you will need to directly connect the Ground wire to a factory approved vehicle chassis ground location. To connect this wire, follow the instructions provided below.

▼ Installation Process - Ground Connection:

1. Remove any vehicle panels, trim, or molding necessary for cable routing and location of a Vehicle Chassis Ground.
2. Locate the vehicle ground location that will be used.
3. Locate the Ignition Sense/Aux Power Cable provided in the hardware installation kit.
4. Route the Ignition Sense/Aux Power Cable from the WS850 unit, to the front of the vehicle (driver-side) where it will be easy to connect the Green Wire to the appropriate Ground location.
5. Connect the Ignition Sense/Aux Power Cable to the vehicle Ground location as follows:
 - a. Locate the Black (Chassis Ground) wire on the Ignition Sense/Aux Power cable and determine how much additional wire will be needed to reach the vehicle ground location.
 - b. Splice the additional wire with the Black (Chassis Ground) wire on the Ignition Sense/Aux Power cable using the provided solder sleeve. Ensure the solder connection is secure. (See *wiring diagram below*)
 - c. Route the Black (Chassis Ground) wire to where it can be connected with the vehicle ground location.
 - d. Connect a provided ring terminal, using a solder sleeve, to the end of the wire that you will be connecting to the ground source.
 - e. Connect the Black (Chassis Ground) wire to the vehicle factory ground location and ensure the connection is secure.
6. Neatly wrap and secure any excess cable/wire and hide under the dash or wherever appropriate.



Ground wires connected to factory ground location in driver-side kick panel.



Another view of the Ground wires connected to factory ground location.

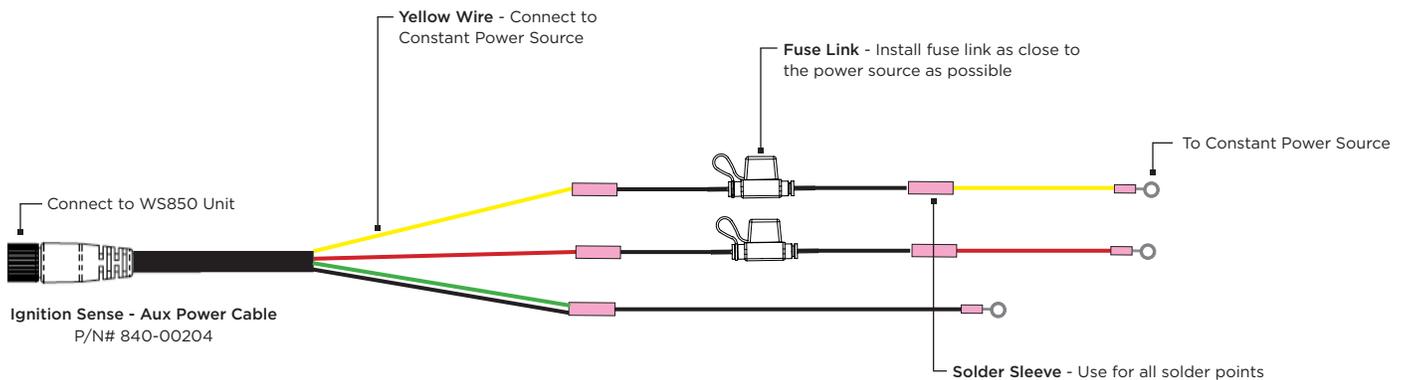
Constant Power Wire Connection

When the WS850 system cannot get primary power/ground from the Vehicle Bus cable, you will need to directly connect the Constant Power wire to a vehicle constant power source location. To connect this wire, follow the instructions provided below.

▼ Installation Process - Constant Power Connection:

1. Locate the vehicle constant power source you are going to use (fuse box power post, jump box, battery, upfitter connector, etc.). Use a multi-meter if necessary to test various connections to ensure constant power (with the vehicle ignition "off"). Refer to *Chapter 10 - Reference Material* for more information on where to connect the various power components by vehicle type.
2. Locate the Ignition Sense/Aux Power cable provided in the hardware installation kit. The 12 ft. Ignition Sense/Aux Power cable will have four (4) separate wires protruding from one end, which will be connected to the power and ground sources, and a socket connector at the opposite end which will be connected to the WS850 unit.
3. Remove any vehicle panels, trim, or molding necessary for cable routing.
4. Route the Ignition Sense/Aux Power cable from the WS850 unit, to the front of the vehicle (driver-side) where it will be easy to connect the cable to the various power and ground sources.
5. Connect the Ignition Sense/Aux Power cable to the vehicle constant power source as follows:
 - a. Locate the Yellow (Constant) power wire on the Ignition Sense/Aux Power cable and determine how much additional wire will be needed to reach the constant power source.
 - b. Splice the additional wire with the Yellow (Constant) power wire on the Ignition Sense/Aux Power cable using the provided solder sleeve. Ensure solder connection is secure.
 - c. Locate one of the fuse links provided in the installation kit and splice about 6" inches of wire and connect to each side of the fuse link using the provided solder sleeves. Ensure solder connection is secure and then set aside for a few moments.
 - d. Route the Yellow (Constant) power wire to where it can be connected with the vehicle constant power source. Note: For a list of recommended power locations, refer to *Chapter 10 - Reference Material*.
 - e. Splice one end of the fuse link with the Yellow (Constant) power wire using the provided solder sleeve. Ensure solder connection is secure.
 - f. Connect the Yellow (Constant) power wire (with fuse link attached) to the vehicle's constant power source. The fuse link should be installed as close to the power source as possible. Use a ring terminal or any other hardware required to make the connection as secure as possible.

Note: Ensure that 5 amp fuses have been inserted into fuse links before connecting to the WS850 unit and powering on the system for the first time post-installation.
6. Neatly wrap and secure any excess cable and hide under the dash or wherever appropriate.
7. After all other power connections are secure, connect the opposite end of the Ignition Sense/Aux Power cable to the WS850 unit.





Use a multi-meter and check voltage to ensure constant power at source location.



Use provided hardware and connect the Constant wire to the vehicle constant power source.



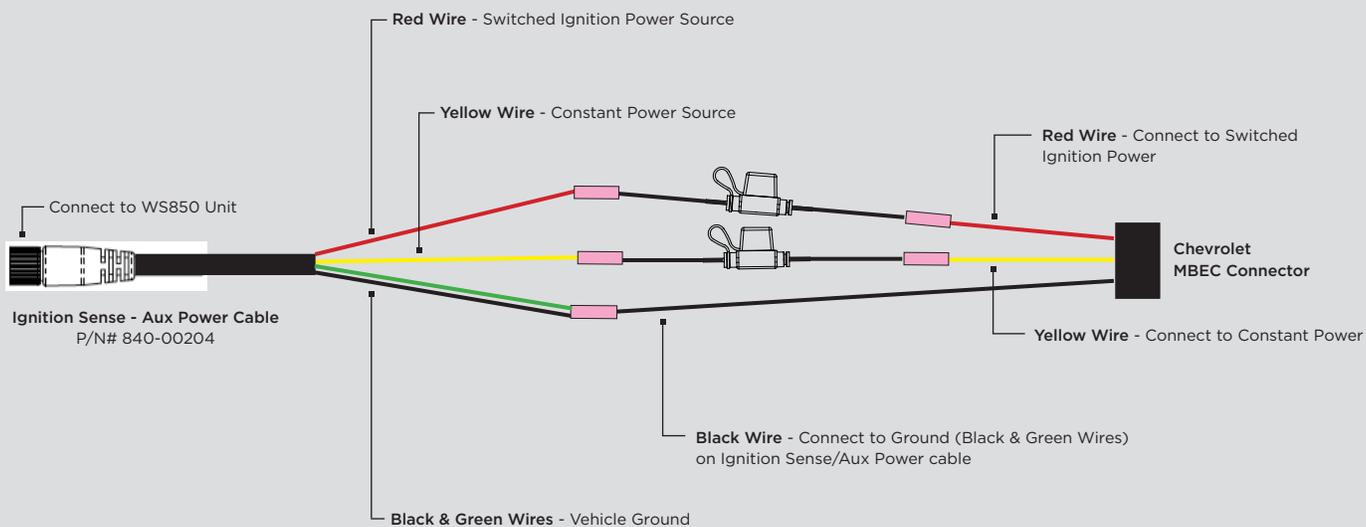
Connect the Ignition Sense/Aux Power cable to the appropriate input on the WS850 unit.



Connecting System Power to Chevrolet Truck MBEC (Mid-Bussed Electrical Connector)

Chevrolet vehicles (2007-2013) have what is known as a “MBEC” connection inside the cab of the vehicle that can be used to connect system power (Constant, Switched-Ignition, and Ground). To use this connection an MBEC connector (P/N# 840-00158 Rev. B) will be required.

The following wiring diagram will provide instructions on how to connect WS850 system power to the Chevrolet MBEC connection.



Connecting System Power to Chevy Coach Builders Loom

WS850 Touchscreen Installation

In This Chapter...

- ▶ Touchscreen Overview 55
- ▶ Touchscreen Installation Overview 56
- ▶ Touchscreen Installation Process 56

This chapter will provide technicians with work instructions on where and how to install the WS850 Touchscreen unit. Topics include, installing the Touchscreen RAM mount bracket, securing Touchscreen to RAM mount bracket, installing the external GPS antenna, and routing cables to the WS850 unit.

WS850 Touchscreen Overview

The WS850 Touchscreen (HMI200) interface is designed from the ground up to give a more customized user experience. Similar to some mobile phones, the Touchscreen presents the users with different applications on the screen to complete different activities.

The WS850 Touchscreen has been designed to house all of the communications and interface functionality. The main hardware components of the Touchscreen include: iButton Fob Sensor, Cellular 3G Modem and Receiver, Wi-Fi Receiver, GPS Receiver with Dash Mount Antenna, and an RF (Radio Frequency) Enable/Disable Key Switch.

The WS850 Touchscreen interface will require the use of a Dash Mounted GPS Antenna. The purpose of the antenna is to boost the quality of the GPS signal. The GPS Antenna is to be installed on the vehicle dash, where it will have a line-of-sight to the GPS satellites.

The WS850 Touchscreen interface also utilizes an RF (Radio Frequency) Enable/Disable Key Switch. Included in the hardware kit is the RF Key and an orange colored safety strap that will be used as the RF Key Ring. The purpose of the RF Key is to temporarily disable the systems RF communication (Wi-Fi/Cellular/Satellite). This is commonly used by customers that enter areas regulated by the FCC restricting the use of all RF communications.

WS850 Touchscreen Interface Hardware at a glance:



WS850 Touchscreen Hardware

				
WS850 (HMI200) Touchscreen (P/N# 900-00085)	Touchscreen RAM Mount Bracket	External GPS Antenna	Wi-Fi Antenna	RF Key Strap
				
RAM Mount Dash Plate (For Dash Installations)	RAM Mount Hardware	WS850 Touchscreen Adapter Cable (P/N# 000-00000)	SIM Card	

WS850 Touchscreen Installation Overview

The WS850 (HMI200) Touchscreen interface will need to be installed in a location that will allow the driver to have easy access to interact with the unit. Typical locations include the dash, center console, or on the floor between the driver and passenger seats. The WS850 Touchscreen includes a RAM adjustable mounting bracket with hardware (to include a 4"x 4" inch backing plate) for easy installation in most vehicles.



Follow these important guidelines when installing the WS850 Touchscreen

- Route wiring so that it does not come into contact with any of the vehicles moving parts (i.e. seat adjusters, sunroofs, brake and clutch pedals, glove box, etc.).
- Be sure to keep all wiring away from radiant heat sources.
- Route wires in and through areas where they are least vulnerable to damage from subsequent assemblies.
- Route wiring away from potentially damaging vehicle surfaces, such as sharp objects, raw sheet metal, sharp metal flanges, etc.
- Any wiring routed through raw metal surfaces will have the appropriate sized rubber grommet or hoe edge protector installed. Taping the raw metal edge is not an acceptable means of protection.

WS850 Touchscreen Installation Process

This section will provide installation instructions for mounting the WS850 Touchscreen Interface, installing the dash mount GPS antenna, and connecting the WS850 Wi-Fi antenna.

1 Install WS850 Touchscreen Interface

As previously mentioned, the WS850 Touchscreen Interface is installed using a "RAM" mount bracket that allows for easy installation in most vehicles. Follow the process below to install the WS850 Touchscreen interface.

▼ Installation Process:

1. Locate where the WS850 Touchscreen Interface RAM mount will be installed and mark the area. When determining the mount location, ensure that you will be able to install the RAM mount without damaging any vehicle components (i.e. electrical wires, fuel tank, fuel lines, etc.)
2. Install the RAM mount base using the provided hardware. Use all four (4) screws when installing the RAM mount base in the vehicle.
3. Attach the RAM mount bracket to the WS850 Touchscreen unit using the provided hardware.
4. Secure the WS850 Touchscreen unit (with RAM mount bracket) to the RAM mount base (installed in vehicle).
5. Route the WS850 Touchscreen cable under the vehicle dash (towards the passenger-side) to where it can be connected to the WS850 Touchscreen adapter cable (serial to 8-pin).
6. After connecting to the adapter cable, route the cable to where it can be connected to the WS850 unit. Note: There is an extension cable (1 meter or 3 meter) that can be used to extend the overall cable length where it can be connected to the WS850 Unit.
7. Neatly wrap and secure any excess cable using the provided cable ties and tuck the excess cable away under the dash, where it will not interfere with any vehicle components.
8. Connect the WS850 Touchscreen cable to the "User Interface" input on the WS850 unit.



Locate where to install the WS850 Touchscreen interface.



Install the WS850 Touchscreen RAM Mount base.



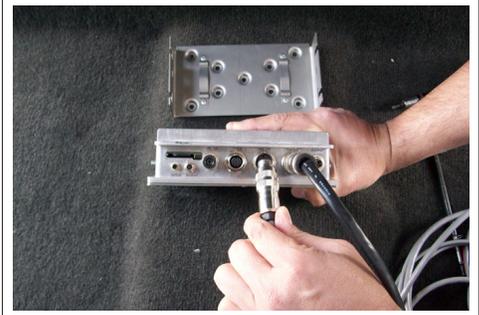
Attach RAM mount bracket to WS850 Touchscreen unit.



Attach WS850 Touchscreen unit to RAM mount base.



Wrap and secure any excess cable where it will not interfere with any vehicle components.



Route WS850 Touchscreen cable and connect to User Interface input on WS850 unit.

2 Install Dash Mount GPS Antenna

The WS850 Touchscreen unit will require the use of a dash mount GPS Antenna. The purpose of the antenna is to boost the quality of the GPS signal. The GPS antenna should be installed on the vehicle dash, where it will have line-of-sight through the windshield to the GPS satellites in the sky.

▼ Installation Process:

1. Locate the area on the dash where you are going to place the GPS antenna and thoroughly clean the dash surface with an alcohol wipe. The GPS antenna should be installed on the passenger-side of the dash, approximately 6" - 12" inches from the a-pillar, or edge of the windshield.
2. Locate and place 1-2 adhesive pads on the bottom (silver-side) of the GPS antenna.
3. Remove plastic backing from the adhesive pads on the antenna and adhere the GPS antenna to the dash (in the desired location) and hold in place for approximately 10 seconds to allow the adhesive to bond with the dash surface.
4. Route the antenna cable down the a-pillar or under the dash to where it can be connected to the back of the WS850 Touchscreen interface. Try to avoid drilling any holes in the vehicle dash to route the cable. Use factory cutouts or route the cable in a fashion that will not require a hole to be drilled.
5. Connect the GPS antenna cable to the GPS antenna input on the back of the WS850 Touchscreen unit.
6. Neatly wrap and secure any excess cable where it will not come into contact with any vehicle parts or components.



Place 1-2 adhesive pads on the back of the GPS antenna.



Adhere GPS antenna to the passenger-side of the dash.



Connect GPS antenna cable to the input on the back of the WS850 Touchscreen unit.

3 Install Wi-Fi Antenna

The WS850 Touchscreen unit will require the use of a WiFi Antenna. The purpose of the antenna is to boost the quality of the WiFi signal. The WiFi antenna needs to be connected to the WiFi antenna input found on the top of the Touchscreen User Interface. Follow the steps below to connect the WiFi antenna.

▼ Installation Process:

1. Locate the WiFi Antenna found in the Touchscreen Hardware Kit.
2. Connect the antenna to the WiFi antenna input, which can be found on the top of the Touchscreen Interface.
3. Fold the WiFi Antenna 90 degrees to the side in order to minimize any potential damage.



4 Install GPRS (Cellular) SIM Card

The WS850 requires the use of a SIM Card in order to communicate across the GPRS (Cellular) Network. The SIM Card is a unique identifier of the inthinc device and must be provided by inthinc. Contact inthinc Technical Support if the SIM Card is not available. Follow the steps below to install the SIM Card.

▼ Installation Process:

1. Locate the SIM Card and remove the card from the plastic. Make sure to notate the SIM Card number on the WS850 Installation Checklist.
2. Open the access door on the side of the Touchscreen unit.
3. Insert the SIM Card into the SIM Card port, making sure to insert the card in the correct orientation.

Note: The SIM Card must be completely seated (inserted) in order for the device to communicate. Verify that the edge of the SIM Card is flush with the side of the port.



WS850 Satellite Antenna Installation

In This Chapter...

- ▶ **WS850 Satellite Overview** 61
- ▶ **WS850 Satellite Installation** 62

This chapter will provide technicians with work instructions on how to install the WS850 Iridium™ satellite antenna.

WS850 Satellite Antenna Overview

As an extra peripheral, the WS850 has the option of adding a roof-mounted Satellite Communications Antenna. The Antenna was designed for a simple installation and consists of a single puck-style enclosure that contains both the communication antenna as well as the communications modem. This section will provide technicians with instructions on how to install the Satellite Antenna.



Follow these important guidelines when installing the WS850 Satellite Antenna

- The Satellite antenna needs to be mounted to a flat surface, with line of sight to the satellites in the sky. Type of vehicle and rood construction will have an impact on where the antenna needs to be mounted.
- Look for ways to route the cable. Try to use existing points of entry, or moldings, to route the cable. If necessary, use grommets and/or sheathing, so the cable will not rub against anything abrasive or sharp.
- Do not allow the cable to come into contact with anything hot. Utilize the most efficient and professional routing method possible.
- Remove necessary items (i.e. the headliner, or third brake light) to access appropriate drill path. Ensure that drilled hole has at least 1/2" inch clearance from obstructions, such as the roof support.

WS850 Touchscreen Hardware

			
WS850 Satellite Antenna	Touchscreen Breakout Cable	8-Pin Extension Cable	(Optional) Single Puck Antenna Bracket

▼ Installation Process - Satellite Antenna:

1. Locate the Iridium Communications tag on the bottom side of the modem and notate the IMEI number on the WS850 Installation Checklist.
2. Locate where you are going to install the roof-mounted satellite antenna on the exterior of the vehicle, allowing an unobstructed view of the sky.
3. Remove any vehicle panels, trim, or molding necessary to access the installation site and to route the 8-Pin extension cable to the Satellite input on the Touchscreen Extension cable, usually located under the vehicle dash.

Note: A 1-Meter and 3-Meter 8-Pin extension cable is available. Make sure to choose the appropriate cable, giving yourself enough length.

4. Making sure the surface is flat; clean the installation location of any dirt or debris.
5. Safely drill a 15mm 5/8" hole at the desired location.
6. Remove the mounting nut and insert the threaded mounting stud through the mounting hole.
7. Slide the slotted mounting nut on the stud and tighten until secure.
8. Connect the appropriate length 8-Pin extension cable to the Antenna cable and route to the Satellite Communication port on the Touchscreen Extension cable; however, **DO NOT** connect the Satellite Extension Cable to the Satellite Communication port until **AFTER** the device has been properly programmed.
9. Neatly wrap and secure any excess cable so that it will not interfere with the operation of vehicle components.



Remove any necessary items, such as the headliner, to route the antenna cable.



Using the appropriate hardware, punch a hole into the the vehicle exterior, for antenna placement.



Secure antenna in place and connect appropriate cable.

WS850 Program Hardware

In This Chapter...

- ▶ **Testing & Programming Overview** **65**
- ▶ **WS850 System Programming** **65**
- ▶ **WS850 System Testing** **70**

This chapter will provide technicians with work instructions on how to test the WS850 system to ensure hardware components are working as intended and how to successfully program the WS850 system.

WS850 Testing & Programming Process

After completing the installation of all WS850 system hardware, the next step in the installation process is to configure and program the WS850 system. After programming, the last step in the installation process is to test the system to verify all installed hardware components are working as intended.

Programming the WS850 system is the process of entering information, using the WS850 Touchscreen interface, to configure vehicle-specific settings and to download the appropriate firmware files to the WS850 unit. While programming the WS850 system, you will initiate what is known as an “Install Event”, which will configure the WS850 system to communicate with the appropriate inthinc servers and complete the Programming process.

The primary objective when testing the WS850 system is to confirm that the system is capable of powering on and communicating with inthinc servers. Additionally, you will want to test and verify any other installed hardware components are working as intended (i.e. external seatbelt sensor hardware). It is highly recommended that each hardware component is tested, to verify it is working, prior to putting the vehicle back together.

This section will provide instructions on how to test and verify WS850 hardware is working and how to successfully program the WS850 system and initiate the Install Event.

1 WS850 System Programming

Programming the WS850 System is the process of downloading (vehicle-specific) firmware and configuration files to the WS850 unit, and initiating what is known as an **Install Event**. The Install Event will establish communication between the WS850 unit installed in the vehicle and inthinc servers.

When the WS850 Touchscreen interface is installed, technicians will program the WS850 system using an on-board tool called the **Installation Wizard**. The Installation Wizard provides easy to understand, on-screen instructions, that technicians can follow to program the system. Based on the information technicians input when completing the Install Wizard, the WS850 system will automatically download the appropriate (vehicle-specific) firmware and configuration files.

The last step before completing the Installation Wizard is to initiate the Install Event notification. Once the Install Event notification has been received by the inthinc web portal, and all of the hardware has been tested and verified as working, the WS850 system installation is complete.



Things to Consider when Programming the WS850 System

- The WS850 system utilizes an “Installation Wizard” that provides step-by-step, on-screen, programming instructions.
- To program the WS850 system, you will need to know the “Company ID” and “Host” information. For assistance, or if you do not have this information, please contact inthinc Technical Support (1-866-294-8637 opt. 3).
- The vehicle needs to be on a relatively flat surface during programming to properly “orient” the device and send a successful “Install Event” to the portal. If the device is not able to orient correctly, the Install Event will not be successful.
- The WS850 system must be powered on for at least ten (10) minutes, prior to sending the Install Event notification to the portal. This allows the system adequate time to boot up after initial power on.
- To access the Programming Wizard on the WS850 Touchscreen, you will need to know the “Programming” password. For assistance, or if you are not a “Certified” technician, please contact inthinc Technical Support (1-866-294-8637 opt. 3).

Continued on next page...

▼ Programming Process:



Important Note:

The WS850 system must be powered on for at least ten (10) minutes, prior to sending the "Install Event" notification. (See step 7 below)

1. From the WS850 Touchscreen interface main menu, select the "About" application. The About screen will display.
 - a. Verify that the device has acquired a cellular connection by scrolling the screen to find the following information:
Note: Scroll by tapping once either at the top or bottom of the screen.
 - i. inthinclr[5.xx]
 - activeConnections=1
 - activeNetwork=mobile
 - ii. If the previous information is not seen, contact inthinc Technical Support for further troubleshooting.
 - b. Verify that the device has updated all internal clocks by scrolling the "About" screen to find the following information:
 - i. inthincapi[5.xx]
 - Device detected=headunit
 - Ntp attempts=30
 - Ntp successes=11
 - Time After correction=12 Nov 2013 15:11:28 GMT
 - Time Before correction=12 Nov 2013 15:11:27 GMT
 - activeConnections=0
 - current GMT-1 Jan 1970 16:00:09 GMT
 - ii. inthincapi[5.xx]
 - Device detected=ivmm
 - Ntp attempts=30
 - Ntp successes=11
 - Time After correction=12 Nov 2013 15:11:28 GMT
 - Time Before correction=12 Nov 2013 15:11:27 GMT
 - activeConnections=0
 - current GMT-12 Nov 2013 16:00:09GMT
 - c. If all 6 of the previous timestamps are not at least the same day, then wait for Ntp successes=11, and reboot the device by performing the following steps:
 - i. Turn the Vehicle Ignition to the off position
 - ii. Disconnect the Vehicle Bus Cable
 - iii. Wait 30 seconds
 - iv. Reconnect the Vehicle Bus Cable
 - v. Start the device by turning the Ignition Key to the ON position
 - d. Once the all 6 of the previous timestamps have been updated to the same day, continue with the programming procedure.
2. Go to the "About" screen by touching the "About" application.
 - a. Press the "Install" button.
 - b. Press anywhere in the password field, enter the "Programming" password, and press the "Next" button to continue.
 - c. From the Installation Page, enter the following information:
 - i. **Company ID** - Enter the "Company ID" for the customer. If you do not have this information, contact inthinc Technical Support.
 - ii. **Vehicle ID** - Enter the "Vehicle ID" (provided by customer) as an asset identification.
 - iii. **Odometer** - Enter the current "Odometer" (vehicle mileage) reading from the vehicle.
 - iv. **Orientation** - Enter the "Orientation" number for the placement of the WS850 unit. (See *Orientation Diagram on page 67*)
 - v. **Host** - Enter the "Host" (portal) information. If you do not have this information, contact inthinc Technical Support.
 - d. Press the "Time zone" button and select the appropriate time zone from the list of available options. Note: For DOT Hours of Service (HOS) regulated vehicles, the time zone must be the "Home Terminal" for the vehicle.
 - e. [Optional] If the external seatbelt sensor hardware was installed, check the "External Seatbelt Sensor Installed" check box. This will allow the system to program for use of the external seatbelt sensor hardware.

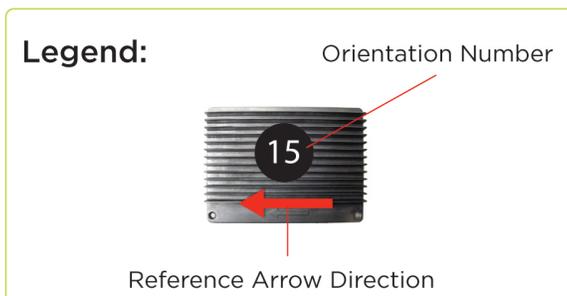
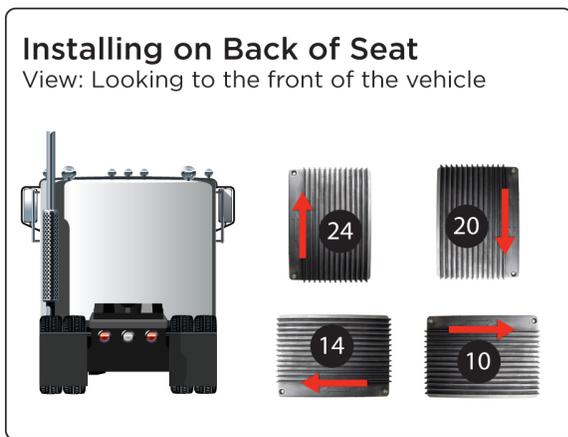
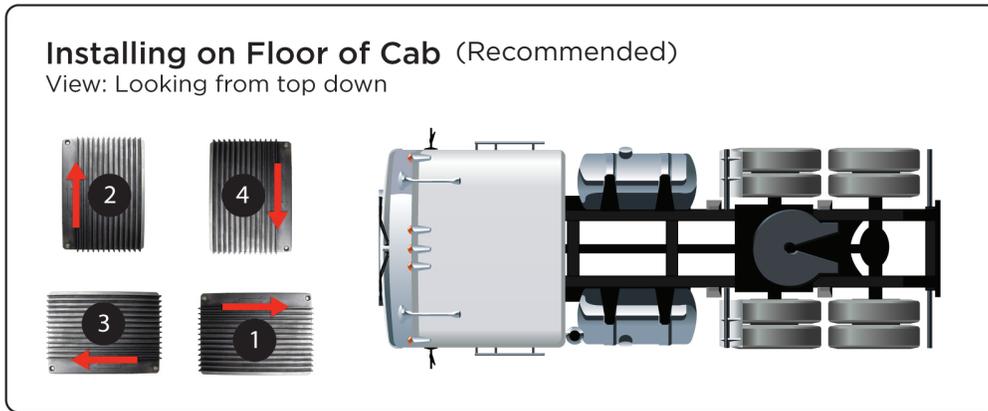
▼ Programming Process (continued):

- f. After completing the form, press the "Install" button at the bottom of the screen. This will complete the installation and send an "Install Event" notification to the inthinc web portal. Once the install event notification has been received by the inthinc portal, the system is communicating. This process can take up to 15 minutes, however in most cases will only take a few minutes when the system is within good communication range. (See image below)
Note: To verify the Install Event notification has been received by the inthinc portal, you will need to contact inthinc Technical Support. See the next section, Post-Installation for instructions on this process.

3. After the Install Event has completed, an audible "Install Succeeded" notification will be repeated and the device will need to be rebooted.
 - a. Turn Vehicle Ignition to the "off" position and reboot the device.

<p>About screen displayed. Press "Install" button to launch the Installation Wizard.</p>	<p>Complete all required information and press the "Install" button to initiate Install Event.</p>	<p>An "Install Event" notification will be send to the inthinc portal.</p>

Use the following diagram to determine the "orientation" code, which is based on the position the WS850 unit is installed.



2 WS850 System Testing

As mentioned earlier, the primary objective when testing is to confirm that the system is capable of powering on and communicating with inthinc servers. Additionally, you will want to test and verify any other installed hardware components are working as intended (i.e. external seatbelt sensor hardware).

When the WS850 Touchscreen interface is installed, technicians can test system communication and hardware functionality by viewing the “About” and “Troubleshooting” applications on the Touchscreen. This section will provide instructions on how to test system communication and hardware functionality.

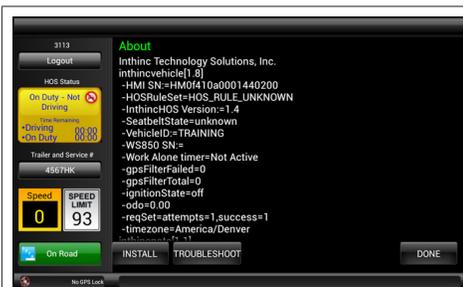


Things to Consider when Testing WS850 System Communication and Hardware

- To complete testing and troubleshooting, technicians will need to know the WS850 Touchscreen “programming” password to access the test applications. If you do not have this information or you are not a “Certified” technician, please contact inthinc Technical Support (1-866-294-8637 opt. 3) for assistance.

▼ Testing Process:

- From the WS850 Touchscreen interface main menu, select the “About” application. The “About” screen will display.
- From the About screen, press the “Troubleshoot” button. *(See image below)*
- Press anywhere in the password field, and enter the “Programming” password and press the “Next” button to continue.
- Test any of the following (installed) hardware components by pressing the “Go” button next to each component listed on the screen *(See image below)*:
 - Satellite** - This feature is not currently being used. Testing is not necessary at this time.
 - GPRS** - Testing GPRS will indicate the current status of Cellular (GPRS) communication.
 - Wi-Fi** - This feature is not currently being used. Testing is not necessary at this time.
 - Ignition State** - Testing ignition state will indicate the current ignition status (ignition on/off). First test the system with the vehicle ignition “on”, then retest the system with the vehicle ignition “off” and verify the ignition states are correct. Note: You must exit the screen after each status check, otherwise updates will not occur.
 - Seatbelt State** - Testing seatbelt state will indicate the current seatbelt status (buckled/unbuckled). First test the system with the seatbelt buckled, then retest the system with the seatbelt unbuckled and verify the seatbelt states are correct. Note: You must exit the screen after each status check, otherwise updates will not occur.
- After all of the installed hardware components are tested and verified as working, it is safe to proceed to the next section.



WS850 Touchscreen “About” screen will display important system information.



Various hardware components can be tested from the “Troubleshooting” screen.

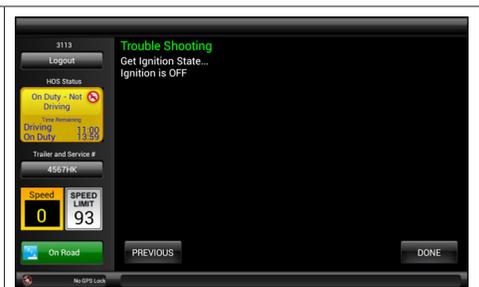


Image displays the test results for the Ignition State.

Post-Installation

In This Chapter...

- ▶ **Post-Installation & Wrap Up** **73**

This chapter will provide technicians with an overview of all the tasks associated with Post-Installation.

Post-Installation & Wrap Up

After you have installed, tested, and programmed the WS850 system in the vehicle, there are a few last steps before the installation is complete. First, you will need to make sure that all vehicle parts have been reassembled and the installation meets our quality standards. Then the vehicle needs to be taken on a test drive to ensure the waySmart system is working properly. Additionally, you will need to ensure that the work area is clean of any debris that may have been the result of the installation. The last steps are to contact inthinc Technical support to verify the installation, and then complete the and transmit the Installation Checklist. This section will cover the various tasks associated with Post-Installation.

1 Reassemble the Vehicle

After installing all of the WS850 system hardware, replace any vehicle panels, trim, molding, etc. that may have been removed for the installation. inthinc has a very high standard for professional quality and workmanship, which should be apparent in the quality of the installation.

▼ Ensure the following aspects of the installation meet our standard of quality:

1. Have all wires been neatly wrapped, secured, and tucked away so they will not interfere with the operation or maintenance of the vehicle?
2. Have all vehicle panels, trim, and molding been replaced?
3. The vehicle and installation site must be cleaned of all remnants of the installation. (i.e. wire trimmings, solder connectors, etc.)
4. Have all of the personal and company belongings been returned to the vehicle?

2 Vehicle Test Drive

After the vehicle has been completely reassembled, it is prudent to take the vehicle on a test drive to ensure all aspects of the system are working as intended. If any aspect of the system is not working during the test drive, there is an opportunity to troubleshoot and remedy the issue prior to the installation being completed and leaving the site.

▼ While conducting the Test Drive, complete the following:

1. **Generate a “No Driver” Notification** - Login to the WS850 system using an invalid Key Fob or Driver ID and begin test drive. Within a few minutes you should hear an audible alert (No Driver). Continue driving for at least 30 seconds so that the event will trigger the “No Driver” notification to be sent to the inthinc portal.
2. **Verify WS850 System GPS** - When logged in, and the vehicle is outside, the current latitude and longitude will display in the lower-left corner of the WS850 Touchscreen display.
3. **Test Seatbelt Operation** - Stop the vehicle, unbuckle the seatbelt and then continue driving. You should hear an audible alert (Seatbelt). Continue driving for at least 30-60 seconds so that the event will trigger a “Seatbelt” notification to be sent to the inthinc portal. Note: Complete this test in a safe environment, at a relatively low rate of speed (15-20mph).
4. **Perform Hard Brake Maneuver** - If safe to do so, perform a hard-brake maneuver by stepping hard on the brakes (at a relatively slow speed). You should hear an audible alert (Aggressive Driving). The event will trigger a “Hard Brake” notification to be sent to the inthinc portal.

3 Clean Work Area

It is important that inthinc maintains a professional image in the presence of our customers, therefore cleaning the work area after completing an installation is highly important. Return any items, such as tools, extension cables, etc., that may have been borrowed from the site. Clean the work area of any debris, trash, wire clippings, etc. to make the area look as good, if not better, than before arriving at the site to complete work. inthinc maintains a high standard for quality and professionalism, and we want this to be apparent in every aspect of the job we do.



4 Contact inthinc Technical Support

After completing the vehicle test drive, the next step is to contact inthinc Technical Support to verify WS850 system functionality and configuration. When contacting support you will need to verify the following:

No.	Step	Description
1	Verify the "Install Event" Notification	Ask the support representative to verify the "Install Event" notification has been received in the inthinc portal for the vehicle the WS850 was installed in.
2	Verify WS850 System Communication	Ask the support representative to verify there is Trip data in the portal for the specific vehicle. During the vehicle test drive, "trip" data should have been sent to the inthinc portal.
3	Verify "Ignition On" and "Ignition Off" Events	Ask the support representative to verify there are Ignition On and Ignition Off notifications recorded in the inthinc portal.
4	Verify the Vehicle Configuration Settings have been accepted	Ask the support representative to verify that the "Vehicle Configuration" template has been downloaded by the vehicle.
5	Verify the Vehicle Bus Configuration Settings	Ask the support representative to verify that the "Vehicle Bus" template has been downloaded by the vehicle.

inthinc™ Support - (866) 294-8637, option 3

5 Installation Checklist

The last step in the Installation process is to complete the Installation Checklist, obtain customer signatures to indicate work performed meets expectations, and to submit a copy of the Installation Checklist to inthinc for administrative review and record keeping. For more information on how to complete and submit this form, see *Installation Checklist on page 29*.

inthinc		 White: Inthinc copy (fax to 801-886-2849) Yellow: Customer copy Pink: RMA copy Gold: Tech copy					
WS850 Installation/Maintenance Checklist							
Installation Type: <input type="checkbox"/> New Install <input type="checkbox"/> Removal/Reinstall <input type="checkbox"/> Swap Out <input type="checkbox"/> Repair		Customer: _____					
Date:	Time Started:	Time Completed:	Location:				
Company ID:	Host:		Make:				
Vehicle #:	Mileage:	Orientation #:	Model:				
WS850 SN #:	Modem SN #:	Touchscreen SN #:	Year:				
Technician Name:	Certification #:		VIN:				
Pre-Installation							
1	Is the waySmart unit to be installed complete with all necessary components? If NO, list missing parts.	YES	NA	NO			
2	Does installer have all proper personal protective equipment?	YES	NA	NO			
3	Does installer have all necessary tools to complete installation?	YES	NA	NO			
4	Has the installer performed a complete walk around inspection of vehicle? (List any issues in the Notes section)	YES	NA	NO			
5	Are all interior and exterior lights functioning? Are all factory and after-market equipment functioning? If NO, contact supervisor and get signature.	YES	NA	NO			
6	Are there any knobs or buttons missing or broken inside vehicle? Any trim or molding missing or broken? If YES, contact supervisor and get signature.	YES	NA	NO			
7	Was any other monitoring system removed that may have been in vehicle? (If so, list in the Notes section)	YES	NA	NO			
8	Use a voltmeter to read the Static and Dynamic Voltage. ** If Dynamic Voltage is not at least .6 volts GREATER than Static, or if Static is lower than 11.5. Inspect in: Domes lights on, doors open. Advise supervisor and get signature.***	Static Voltage		Dynamic Voltage			
Notes:							
Installation							
1	Indicate which hardware components were installed:	WS850	HM20R	Speaker	Modem	1-901x	Sat
2	Indicate how the Constant Power was connected:	Battery	Fuse Through	Coach Lock	Other:		
3	Indicate how the Switched Ignition Power was connected:	Fuse #:	Fuse Through	Club Fuse Box	Eng. Fuse Box	Other:	
Post-Installation							
1	Has the "Install Event" been confirmed? By what method? (For assistance, call 1-866-294-8637 ext.3)	Technical Support Case #:	Test Message	inthinc Portal	Tech Support		
2	Are the antennas secure and tight and in their proper location?	Complete	NA	NO			
3	Have all electrical connections been hard wired with provided solder sleeve connectors or soldered and heat shrink?	Complete	NA	NO			
4	Are all cables neatly wrapped, secured with zip ties and tucked away from any moving components on the vehicle? (i.e. parking brake cable, steering column, etc...)	Complete	NA	NO			
5	Are all of the vehicle components still working properly? (i.e. radio, windshield wipers, heater, air, cd radio, power windows, etc...)	Complete	NA	NO			
6	Was the vehicle taken for a test drive to test hardware functionality, as per the Installation Manual? Any issues? (List below)	Complete	NA	NO			
7	Does the waySmart system have GPS lock?	Complete	NA	NO			
8	Has the vehicle been completely reassembled?	Complete	NA	NO			
9	For Supervising Official: Does the quality of this installation meet or exceed your expectations?	YES	NA	NO			
Any problem with the installation? If so, detail here (include NMA number, if applicable):							
10							
Inspected By Print: _____				Date: _____			
Inspected By Signature: _____				Date: _____			
Customer Signature: _____				Date: _____			
Give a copy to customer. Keep a copy, and Mail, Email, or Fax a Copy to INTHINC. Attn: Tech Support, support@inthinc.com Fax # 801-417-8812							

Reference Material

In This Chapter...

- ▶ **WS850 Power Locations** 77
- ▶ **Seatbelt & Vehicle Bus Support** 79

This chapter will provide technicians with valuable reference material, including a list of where to install WS850 power connections, and a Seatbelt and Vehicle Bus support chart that will provide information on the type of Vehicle Bus cable required and if the vehicle has firmware support for seatbelt detection.

WS850 Power Installation Locations

The following table will provide technicians with information on where the WS850 system power components are installed based on the make and model of the vehicle.



Under Development

This section is currently under development. We intend to provide more information with the next iteration of this manual. Check inthinc University™ often for updates on this manual and our entire suite of user documentation.

GENERAL MOTORS						
YEAR	MAKE	MODEL	CONSTANT LOCATION	SWITCHED LOCATION	SW FUSE #	GROUND LOCATION
1996-2006	Chevrolet / GMC	Silverado/Sierra	1			5
2007-2013	Chevrolet / GMC	Silverado/Sierra	3	3		3
2014	Chevrolet / GMC	Silverado/Sierra	1	8	#39	6
FORD MOTOR COMPANY						
YEAR	MAKE	MODEL	CONSTANT LOCATION	SWITCHED LOCATION	SW FUSE #	GROUND LOCATION
2012-2013	Ford	F-150	1	2	# 38	6 or 7
2008-2010	Ford	F-250	1	4		6 or 7
2010-2013	Ford	F-250	1	5		6 or 7
2014	Ford	F-250	1	4		6 or 7
2008-2010	Ford	F-350	1	4		6 or 7
2010-2013	Ford	F-350	1	5		6 or 7
All	Ford	Explorer				
CHRYSLER CORP.						
YEAR	MAKE	MODEL	CONSTANT LOCATION	SWITCHED LOCATION	SW FUSE #	GROUND LOCATION
2010-2012	Dodge	RAM 1500 / 2500	1	8	# M8	7
HEAVY TRUCKS						
YEAR	MAKE	MODEL	CONSTANT LOCATION	SWITCHED LOCATION	SW FUSE #	GROUND LOCATION
All	Peterbilt	-				
All	Mack	-	Power Post (In-Dash)	Power Post (In-Dash)		Post (In-Dash)
All	Kenworth	-				
All	Freightliner	-				

Legend	
No.	Location
1	Engine Fuse Box Power Post
2	Passenger Kick Panel Fuse Box
3	Upfitter Power Connector
4	Customer Access Circuit (Purple Wire)
5	Customer Access Circuit (White Wire/Blue Tracer)
6	Engine Compartment Ground Location
7	Driver Side Kick Panel Ground Location
8	Engine Fuse Box

Seatbelt & Vehicle Bus Support Reference Chart

The following Reference Chart will provide technicians with information such as which vehicle bus cable should be used and if seatbelt is supported by firmware for specific vehicle makes and models.

Make	Model	Year	Vehicle Bus Cable	Seatbelt Support?
Light-Duty Trucks & Passenger Vehicles				
Ford	F-150	2005-2008	OBD-II	No
Ford	F-150	2009-2013	OBD-II	Yes
Ford	F-250/350/450/550 - GAS	2005-2010	OBD-II	Yes
Ford	F-250/350/450/550 - GAS	2011-2013	OBD-II	Yes
Ford	F-250/350/450/550 - DIESEL	2011-2013	OBD-II	Yes
Ford	F-250/350/450/550 - DIESEL	2004-2010	OBD-II	Yes
Ford	Explorer	2011-2013	OBD-II	Yes
Ford	Ranger	2007	OBD-II	Yes
GMC	Sierra/Silverado - GAS/HYBRID	2006-2009	OBD-II	Yes
GMC	Sierra/Silverado - GAS/HYBRID	2010-2013	OBD-II	Yes
GMC	Volt	2012	OBD-II	Yes
Chrysler	Caravan	2008	OBD-II	Yes
Unknown	Any Passenger Car	2008-Newer	OBD-II	No
Heavy-Duty Trucks				
All	Heavy Truck	1996-2001	Deutsch 6-Pin	No
All	Heavy Truck	2002-2007	Deutsch 6-Pin or 9-Pin	No
All	Heavy Truck	2008-2013	Deutsch 9-Pin	No

GPIO External Seatbelt Sensor Installation

In This Chapter...

- ▶ **Seatbelt Sensor Installation** **83**

This chapter will provide technicians with work instructions on how to install the GPIO External Seatbelt Sensor, when the vehicle does not support seatbelt detection through firmware (EMU) support.

Seatbelt Sensor Installation Process

The external Seatbelt Sensor is a magnetic sensor that is attached to the seatbelt buckle and latch that will detect when the seatbelt is engaged. The Seatbelt Sensor is an add-on hardware component that is typically only used when there is no vehicle firmware support to detect seatbelt usage directly from the vehicle bus. This section will guide you through the installation of the external Seatbelt Sensor hardware. This procedure can take up to 45 minutes to complete, allow adequate time for proper adhesion.



Things to Consider when Installing the Seatbelt Sensor

- The external Seatbelt Sensor should only be installed when there is no vehicle firmware support to detect seatbelt usage. (See *Seatbelt Reference Guide* on page 77 for more information on what vehicles are supported through firmware.)
- The external Seatbelt Sensor installation requires the use of a two-part adhesive, which can take up to 30 minutes to cure. Make sure you have ample time to install the hardware.

▼ Required Materials:

The external Seatbelt Sensor is packaged as a kit (P/N# 900-00091), which consists of the contents outlined below. There are also some additional tools that will be required to complete the installation, as indicated below.

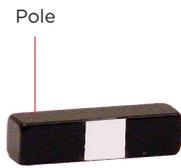
Seatbelt Sensor Hardware				
				
Seatbelt Sensor Kit	Seatbelt Hardware	Permabond Adhesive	Seatbelt Sensor Cable	Magnet
				
Heat shrink Tubing	Magnet Cover	Solder Links	Cable Ties	Sandpaper

Additional Tools Required			
			
Electrical Tape	Butane Torch	Needle Nose Pliers	End Cutting Pliers

▼ Installation Process:

1 Step One

Without adhesive, test the location for fit and operation of the magnet and reed sensor switch:



- 1 The magnet has two sides that are called "poles". The north/south poles are opposite to the side marked with white paint.



- 2 Place the magnet with either the north or south pole touching the metal of the seatbelt latch.



- 3 Place the magnet cover over the magnet and ensure the cover does not obstruct normal buckle engagement. There may be a plastic lip around the latch that prevents you from adhering the magnet and magnet cover to the metal.



- 4 Engage the seatbelt latch into the buckle. The magnet should be on the opposite side of the belt and latch as the release button.

Note: Some seatbelt latches do not have a front and back and can be inserted into the buckle both ways. The sensor needs to detect the latch in either position. Install a magnet on both sides of the latch if needed. This is not typical..

2 Step Two

If there is a plastic lip around the web slot of the seatbelt latch obstructs placement of the magnet and magnet cover, remove that section of the lip. Skip to *Step 3* if this step is not necessary.



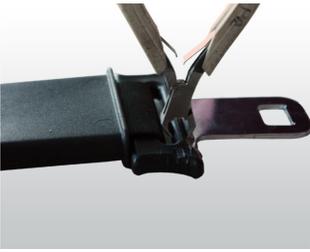
- 1 Place the magnet cover on top of the lip in the desired location.



- 2 Mark the plastic at the ends of the cover ears, leaving approximately 1/16 inch clearance at each end.



- 3 Using angled, flush cut wire cutters, cut the lip at each mark.



- 4 Using wire cutters again, remove only the plastic necessary to clear the mounting site.



- 5 Without adhesive, place one pole side of the magnet on the metal latch and place cover on magnet.

3 Step Three

Test the magnet location for function:



- 1 Hold or tape the reed switch sensor in place on the side of the buckle body opposite the release button so that the long axis of the switch is parallel to the direction of buckle engagement and the cable runs toward the mounting strap.



- 2 Place the end of the switch 1/8" to 1/4" inch from the top edge of the buckle body.



- 3 Mark the location of the magnet, magnet cover, and reed sensor switch to ensure they will be bonded in the same location.

4 Step Four

Prepare the surfaces that will be glued:



- 1 Without removing black coating, lightly sand (1-3 strokes) both pole sides of the magnet (poles are described in step 1).



- 2 Thoroughly sand the magnet cover ears.



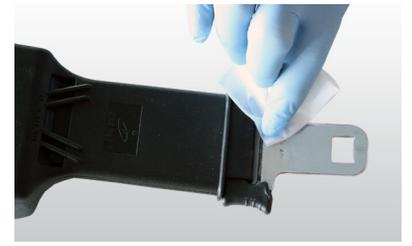
- 3 Lightly sand the reed switch sensor side that will be glued.



- 4 Sand the seatbelt latch where the magnet will be placed.



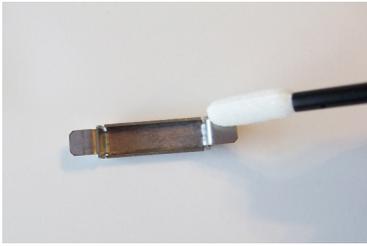
- 5 Sand the buckle body where the reed sensor switch will be placed.



- 6 Clean the magnet, magnet cover, reed switch sensor, and sanded seatbelt surfaces with one of the alcohol wipes provided.

5 Step Five

Glue the magnet and cover to the seatbelt latch as described in the steps that follow:



- 1 Place TA4246 Initiator on the magnet cover ears, the inside of the magnet cover, and one sanded pole of the magnet.



- 2 Place TA4246 Adhesive on the prepared seatbelt latch (small bead) the length of the magnet cover.



- 3 Using pliers, carefully place the initiator-coated magnet pole on the adhesive bead on the latch.



- 4 Place TA4246 Adhesive on the top of the magnet.



- 5 Press the magnet cover in place.



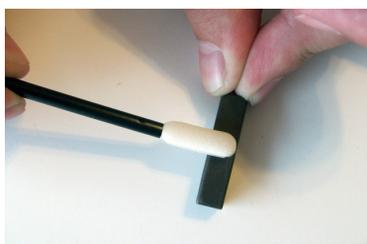
- 6 Before the adhesive dries:
- Engage seatbelt latch into buckle and ensure magnet is properly placed
 - Verify that any extra adhesive does not get on the seatbelt webbing and does not interfere with buckle engagement.
 - Either clamp the cover in place or orient the latch horizontally so that the cover rests in place while the adhesive sets (10-15 minutes).

6 Step Six

Glue the reed sensor switch to the seatbelt latch as described in the steps that follow:



- 1 Put 1/16" inch bead of TA4246 Adhesive on the sanded seatbelt buckle.



- 2 Coat the sanded side of the sensor with TA4246 Initiator.



- 3 Place reed sensor switch on glue with wire extending away from the buckle opening. Do not extend the switch above the top edge of the buckle.



- 4 Use tape to hold the reed sensor switch in place until the adhesive sets. usually about 30 minutes.



- 5 Clean any adhesive off your hands with the provided alcohol wipe.



- 6 After the 30 minute cure time, use another alcohol wipe and thoroughly clean around the bonded areas.

7 Step Seven

Complete the installation by following the steps that follow:



- 1 Wrap the buckle and sensor with the included heat shrink tubing, then use a heat source (such as a heat gun) to shrink the tubing.



- 2 Route the reed sensor switch cable back to the WS850 device in such a way that the cable is not likely to be damaged by driver seat movement or equipment.



- 3 Connect the seatbelt sensor cable to the Seatbelt input on the WS850 unit.

8 Step Eight

Once the Seatbelt Sensor hardware has been installed, the final step is to program and test the seatbelt sensor functionality. To program and test seatbelt functionality, follow the instructions provided in *Chapter 8: Testing and Programming* on page 65.

