ST7200 Installer Guide

ST7200-IG001

ST7200
Installer Guide

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General Notes

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Revision History

Revision	Date	Author (s)	Description of change
0.0	07/01/2014	Renato Mota	Initial revision
1.0	10/07/2014	Ramiro Sanchez	Added Document Control ID Changed format of the document Changed name of the document to :ST7200-IG001 Skypatrol Installer Guide"

Introduction

There are three primary aspects to the installation of the ST7200 vehicle tracking device:

- Power connections
- IO connection and
- Mechanical mounting of the device.

This Installation Guide will help you step by step to accomplish a good installation. This document is a supplement intended to help installers with more difficult or non-standard installations. It will also help with the testing and troubleshooting of installations that don't initially work correctly and will help an installer to install the device more proficiently and faster at repetitive installations.

The device's power wiring harness must be connected to the vehicle's electrical system at three points; power, ground, and ignition sense. Each of these three wires must be connected to an appropriate connection point in the vehicle. Finding and determining the suitability of the appropriate connection point for each wire is described in detail in subsequent sections of this document.

In order to perform the steps outlined below it will be necessary to use a good quality multi-meter. DC voltage up to 24 volts and resistance down to less than one ohm will need to be accurately measured.

When working with vehicle wiring, be very careful that no bare wire, and no tool that comes in contact with a wire, ever makes contact with ground (the vehicle's chassis). This will probably blow a fuse, and could also cause heat and fire. It is always preferable to disconnect the vehicle's battery before doing any work on the vehicle's electrical system.

Be aware, if you decide to disconnect the battery and if the vehicle has an anti-theft-coded radio or is equipped with an airbag. Doing so may cause a warning light to be displayed which may require a trip to the dealer to be corrected.

Mounting of the device

Mounting the device itself is a critical part of the installation that is often mistakenly considered less significant that the other aspects. It is very important to determine an appropriate location for the device and to affix it securely in place and most of the times it's recommended to review location with the owner of the vehicle prior to installation.

Determining the best installation site is based on several factors – adequate space, the availability of the power connections and secure mounting points without excessive vibration.

Preferable installation locations for many vehicles are under the dashboard, under a seat, in the trunk, or inside a console. The beacon is meant to be installed inside the passenger compartment of a vehicle, **not** in the motor compartment. In some trucks or vans it is possible to mount the unit on a side wall, firewall, or internal wall.

Orientation of the beacon is critical to its performance. In some instances visibility is desirable and in other it is not.

The device should be placed where the power wiring and antenna cables can be routed properly, without getting in the way of normal vehicle operations. This means leaving some room behind the device so that the connectors are accessible.

Attaching the device to the vehicle can be a challenge, especially if it is located under the dashboard where there is no such thing as a panel or clear open space. In cases like this it is usually preferable to use plastic cable ties to attach the beacon. The cable ties offer a flexible mounting system that dampens vibration yet securely affixes the device in any orientation. Cable ties can strap the device to brackets, wire bundles, or sturdy fittings of any kind. It is not necessary to use all four corner mounting holes; two or three are usually adequate. Leave the rubber spacers in the holes of the mounting flanges but remove the metal bushing to allow the cable ties to pass through the spacers. It is not necessary to cinch the cable ties completely tight. As long as the device won't rattle or swing around it should be fine.

Tools Required

- Wire cutters / wire strippers
- Voltmeter
- Soldering Iron / Solder
- Electrical tape
- Plastic cable ties
- Screw drivers
- Wrenches/sockets

Before putting back all pieces together once all connection are done and the device is powered; it's strongly recommended to verify with the service provider to check if the readings are correct for the device, and the server is receiving all the information.

Wire Connection Methods

Making electrical connections will usually involve connecting a wire in the wiring harness wire to an existing wire in the vehicle. There are several methods of making electrical connections, some of which will be discussed here in order to help the installer determine the appropriate method for each circumstance.

Twisting Method

Some installers attempt to simply strip the insulation from wires, twist them together, and insulate them with electrical tape. Clearly this is not adequate. Twisted wires have no consistent electrical connection and are mechanically unsound. If you choose this method consider the following diagram tips to make the best connection possible. Fig. 1 and Fig. 2

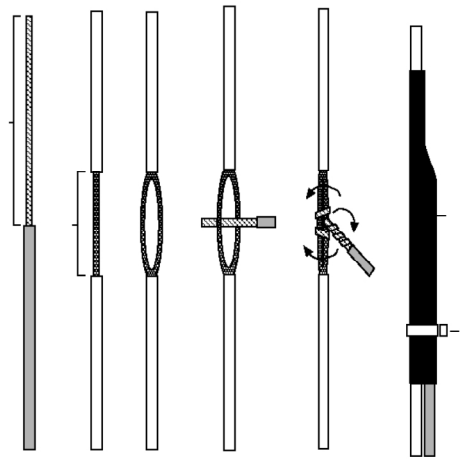


Fig. 1

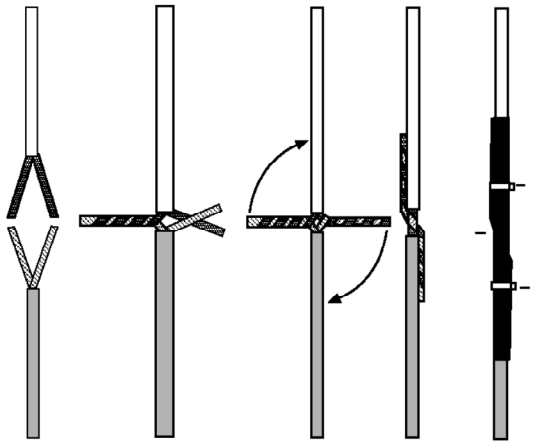


Fig. 2

Crimping Methods

Common types of automotive splicing connectors are known as Insulation Displacement Electrical (IDE) connectors. These are available from many auto parts and electrical supply stores. The connectors make contact by slicing through the insulation of the wire with sharp internal blades which then come in contact with the internal conductors. If this are used wrong way or size it's

possible to cut the main wire. The benefit is quick, easy connections that can be made with a simple hand tool. The drawback is the reliability of the connection. The slicing action punctures the wire's insulation and cuts into the internal conductors. This weakens the wire's mechanical strength, possibly reduces its current carrying capability, and exposes it to corrosion.
IDE connectors are not recommended for durable beacon installations. Fig. 3, Fig. 4, Fig. 5, Fig. 6.

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Soldering Method

The recommended connection between vehicle wires and the beacon's wiring harness is a soldered connection. This is best performed by cautiously stripping a ½ inch section of insulation from the vehicles wire using a razor knife. Next, wrap the bare end of the beacon wiring harness wire several times around the exposed vehicle wire. (Fig. 1 and Fig. 2) Use a soldering iron and rosin-core solder to make the electrical connection. Be sure to get both sections of wire hot enough to melt the solder till it flows freely between the strands of wire. The connection should be held still until the solder cools and solidifies to a shiny metallic bead. After the soldering is complete, wrap at least 5 layers of electrical tape around the connection point, ensuring that the tape adheres to the wires' insulation creating a sealed layer of insulation.

Power Connection

Power for the device is supplied via the red wire of the power wiring harness. Connect this wire to the appropriate connection point in the vehicle as described below.

The ST7200 device requires a power source with a voltage between 6 and 24 volts DC, and a current capability of up to 1 Amp. Most vehicle power systems use 12 Volts DC so the appropriate voltage is relatively easy to access. It's more difficult is to ensure that the 1 Amp current draw can be supplied without trigging the vehicle computer sensor of most of all the new vehicles.

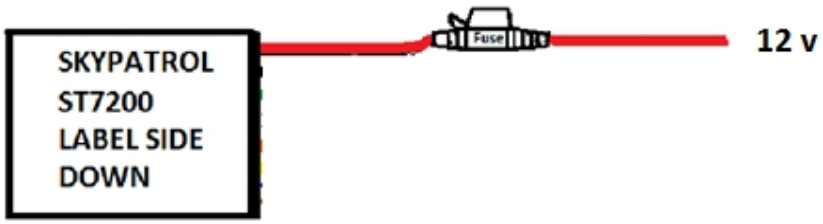
It is critical that the main power source for the device be continuously available, i.e. it is not switched off when the vehicle is off. It must remain above 12 volts and can not be tied to any other switch in the vehicle. Test to be sure that your selected power source is unaffected by switching on and off any lights, turn signals, audio system, heating system, horn, etc.

Some vehicle circuits are current limited as a result of isolating them from other vehicle systems. As an example, the circuits to power the audio systems may be isolated from other systems to reduce noise.

If the device is connected directly to the vehicles battery it will certainly have adequate current delivery capability. If it is connected to some other circuit of the vehicle it must be tested to ensure that the maximum current is available. An adequate test would be to connect the device temporarily and ensure that it can provide tracking points to the user portal. If the temporary electrical connection fails to adequately power the device, it must be connected to another source within the vehicle; in general, the closer to the battery the better.

Good sources of power can be found at the fuse boxes or at the ignition switch. It is also possible to find adequate power sources at certain lights and at power devices like seat adjustment motors. An indication that the chosen power source can supply adequate current will be the gauge of the wire. If it is very thin, such as 18 Gauge or lighter, it is not meant to carry high enough currents to supply the existing circuit plus the extra current demands of the beacon. Connect to the heavier power wires in the vehicle.

Connect the RED WIRE from PIN 7 to the Positive side of the Power Supply.



Grounding

Grounding for the device is supplied via the black wire of the power wiring harness. Connect this wire to the appropriate connection point in the vehicle as described below.

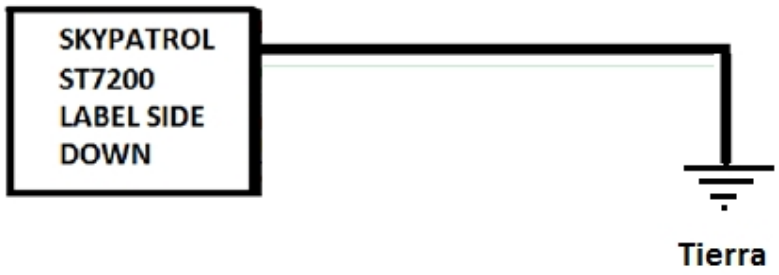
Grounding is every bit as critical as the power connection. On virtually all vehicles the chassis is ground. If it is possible to connect the black wire of the device's power wiring harness to the vehicle's chassis this is the best connection. Be sure the connection method does not add resistance. A crimped-on ring terminal screwed to the chassis should be adequate. Make sure that the chassis connection point is not painted or coated with some other insulating material such as grease, wax, plastic, or anti-corrosion coating.

If connecting directly to the chassis is not possible, it is critical to determine the resistance between the desired connection point and the vehicle's chassis. It is not adequate to measure the voltage of a connection point to determine if it is ground. In other words, a wire that measures zero volts is not necessarily a ground wire.

A resistance of no more than 1 (one) ohm between the connection point and the vehicle chassis should be allowed. This is critical! If the resistance is any higher, the voltage differential between the power source and ground, at full current, might drop below the minimum 6 volts required to power the device.

If connecting to a ground wire rather than the vehicle's chassis, be sure the ground wire is a heavy gauge so it can carry the full maximum current of the device. Do not connect to thin wires of 18 Gauge or lighter. Connect only to the heavier ground wires of the vehicle. Remember, the full supply current of up to 3 Amps will also flow to ground. Heavy ground wires can be found at the fuse boxes, ignition switch, and some of the lights and motors in a vehicle.

Connect the BLACK WIRE from PIN3 to the Ground or Negative of the Power Supply



Ignition Sense

Ignition sense for the device is supplied via the red wire of the power wiring harness. Connect this wire to the appropriate connection point in the vehicle as described below.

The important factors for the ignition sense connection are considerably different from those of the power and ground connection. The ignition sense connection does not draw much current, but it is more than simply a voltage that is switched ON and OFF with the ignition.

It is important to understand that if the device's ignition sense wire is not connected, however, the features of the device will be limited and the reports won't reflect all activities and the reality of the field as the trip report.

As a result, the ideal ignition sense connection point is where 12 volts appears when the vehicle's ignition is ON and a low resistance to ground appears when the vehicle's ignition is OFF.

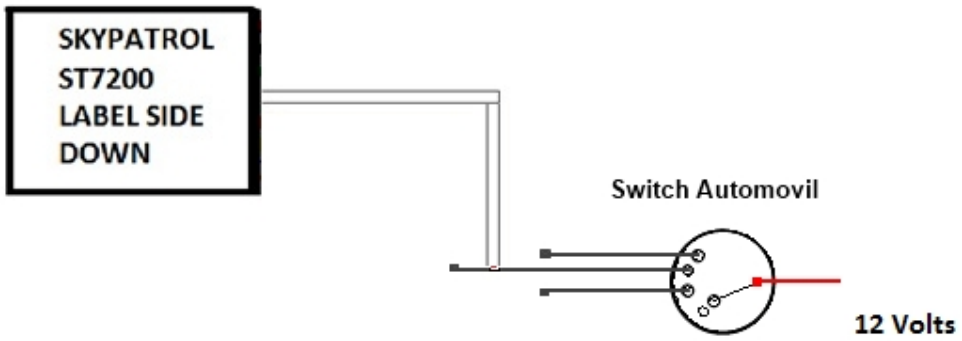
Making the measurements to select the right ignition sense connection point is very particular. Two different parameters must be measured and they can not be measured with the same settings of the multi-meter.

The first parameter to measure is voltage. The voltage of the ignition sense connection point must switch between 0 and 12 volts with the ignition (0 volts with ignition OFF, 12 volts with ignition ON). The second parameter to measure is the resistance to ground with the ignition OFF.

Do not attempt to measure the resistance to ground of the ignition sense connection point when voltage is present, i.e. when the ignition is ON. This could damage your multi-meter

After first ensuring that the voltage at the connection point is zero with the ignition off, measure the resistance to ground. It must be below 50 ohms, preferably below 10 ohms.

Ignition sense connection points can typically be found at the ignition switch, at the fuse boxes, or at certain vehicle systems that are switched with the ignition. Examples are seat-belt detection system, audio system, heating system, and some lights.

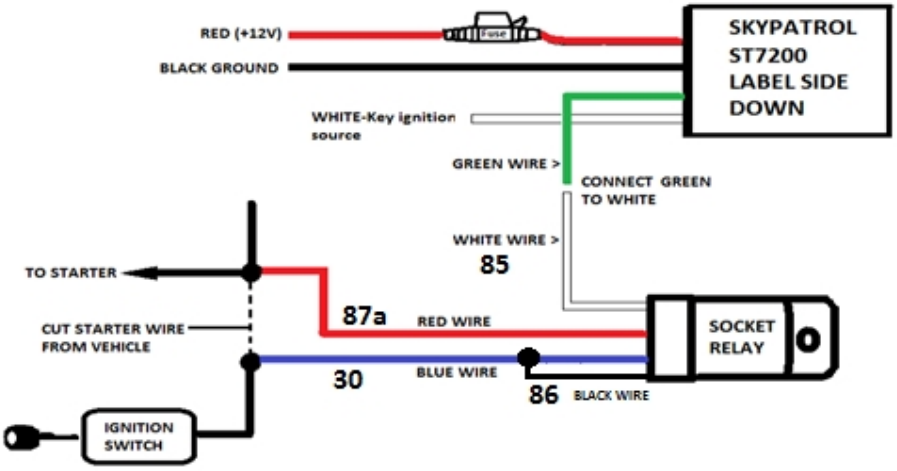


Starter Interrupt

Use the device output wire to activate a relay and disable the vehicle starter. The device output is the green wire.

Cut the starter wire of the vehicle and connect the positive side to pin 30 of the relay; pin 87a of the relay should connect to the negative side of the starter wire; connect the output wire of the ST7200 to pin 85 of the relay; Connect pin 86 of the relay to pin 30 of the relay or to a constant power source when the vehicle ignition is turned on.

Whenever the output wire of the ST7200 sends a ground signal the relay will open, disabling the starter.



Install Auxiliary Input Sense (Panic Button Optional)

The auxiliary input will sense a voltage change of ground and open circuit. This is achieved by installing a switch between the digital input sense on the I/O wiring harness. Input sense is the yellow wire (Pin 2). When the switch is closed the device will sense the state change and record the event. Similarly, when the switch is opened, the device will sense the opposite state change and record the event.

Appendix A – ST7200 Connector Description

Cable Harness CBL-0013C Wire-out and Description

Wire color	PIN name	I/O	Functional Description	Logical State	Port Characteristics
White	IN1	I	Ignition sense	High: Ignition ON Low: Ignition OFF	8 to 24 V <5 V Note: Internally pulled low
Yellow	IN2	I	Input port 2	Alta: Baja:	2.4 to 24 V <0.2 V Note: Internally pulled high
Black	GND		Ground		
Green	OUT	O	Output Port (defaulted open circuit)	Open: Short:	>1 MOhm to ground <1 Ohm to grund 250 mA max sink current
Blue	UART-RX	I	Serial receive Port		3.3 V de Interface Com port settings: Baud rate: 115200 bps; Flow Control: none; 8N1
Brown	UART-TX	O	Serial Transmit Port		3.3 V de Interface Com port settings: Baud rate: 115200 bps; Flow Control: none; 8N1
Red + Fuse	VBATT	I	Main Battery Voltage		6 to 24 V
NA	NA				