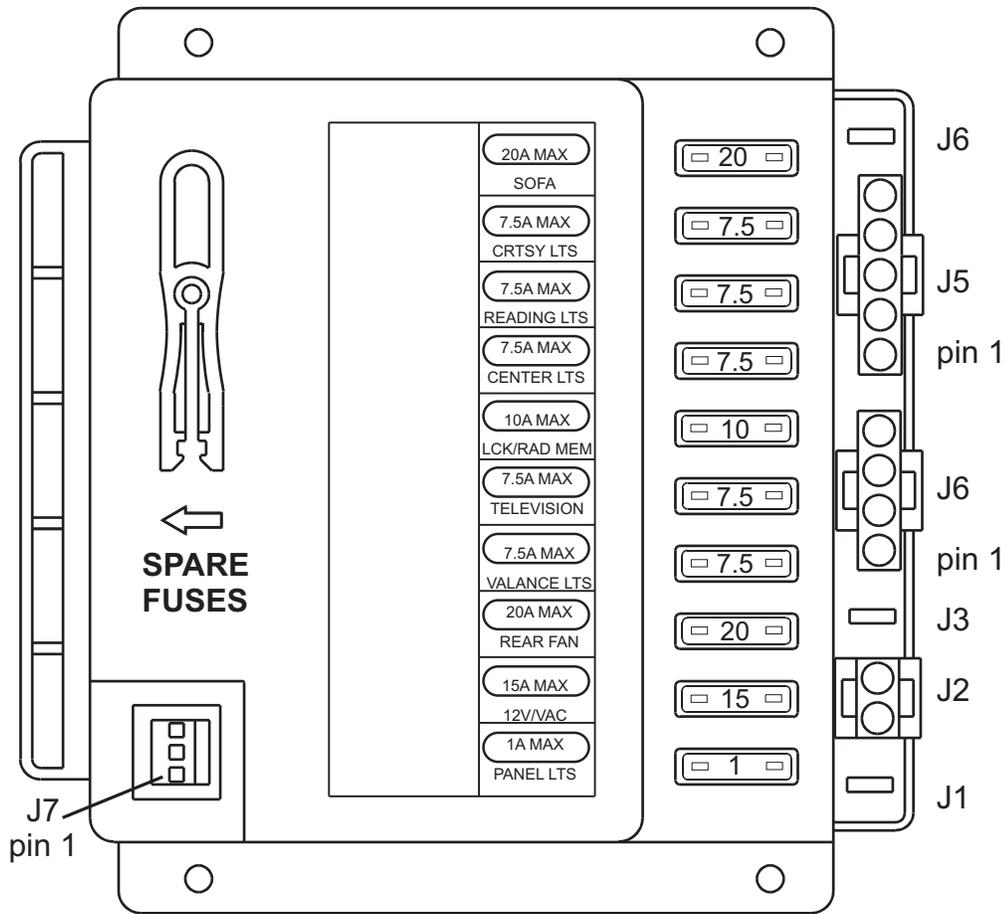


# SMART FUSE BLOCK PLUS™

## SERVICE MANUAL



P/N 00-00334-200

### NOTE:

The SMART FUSE BLOCK PLUS™ is a centralized power switching, fusing, and distribution center. Power from both the ignition and battery is fed into the block. The power of the battery is available at this box. Inadvertent shorts at this box could result in damage and/or injury. *All servicing of this box should be done only by a qualified Service Technician.*

**Tools required:** Low current Test Light, Accurate Voltmeter (digital readout preferred)

**Intellitec**

1485 Jacobs Rd.  
Deland, FL 32724  
386.738.7307

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### PRODUCT DESCRIPTION

The **SMART FUSE BLOCK PLUS™** is intended to be used in conversion vehicles. It provides fusing for the converter-added loads as well as relay controlled outputs for use with lighting and TV circuits. These relay outputs include timed and low voltage shut down features that are used to provide a number of customer pleasing features, such as:

**Automatic Interior Light Delay** - keeps the interior lights on for up to 12 seconds after closing the doors. They will go out immediately when the ignition is switched on. If the doors are left open, the lights will go out in twenty minutes.

**Automatic OFF with the Ignition** - the interior lights and TV/VCP turn off when the ignition switch is turned off.

**Load Operation Without Keys** - allows the interior lights and TV/VCP to operate without the insecurity of having the key in the ignition.

**Automatic Timed OFF Function** - when the loads are operated with the ignition off, they will be automatically shut off 20 minutes after they are turned on with a charged battery. If the battery is low, the loads will turn off in two minutes. After the shut down, the loads can be turned on again for an additional twenty minute period.

**Automatic Low Voltage Shut Down** - when the loads are operated with ignition off, the battery voltage is monitored. If the voltage goes below 12 volts, the loads will be shut off in 2 minutes, minimizing the risk of the loads fully discharging the battery.

**Installation** - this module is designed to work in all brands of vehicles. The module is mounted at the "B" pillar and gets its power from the OEM harness. Two wires are connected to the OEM dome light wires to provide the signal for the interior light delay. The van harness is plugged into the module which supplies all the power for the converter-added loads.

### HOW IT WORKS

The **SMART FUSE BLOCK PLUS™** provides fusing *and* switching for all the converter-added loads. There are ten fuses on this block. Two of these fuses provide constant "hot" outputs that are to be used for loads such as power sofa, door locks, etc. Two other fuses provide ignition switched power for loads that should only be operated when the ignition is on, such as rear fan, radar detector, etc. Five other fuses feed relay-switched outputs. These are: Lights 1, Lights 2, Lights 3, Television, and Courtesy. The last fuse is used to feed the back lighting on the switch panel/s.

### SWITCHED OUTPUTS

Four of the switched outputs are controlled from a remote switch panel, or panels if more than one is used. The switches are a momentary style operating as push on / push off function. These outputs can be used if the ignition is on or off. If they are ON when the ignition is turned off, they will automatically be turned OFF. If the outputs are used with the ignition OFF, they will power OFF automatically twenty minutes after they were turned on, to prevent them from accidentally discharging the battery. If the battery voltage is low, (below 12.1 volts), the lights will be turned off in two minutes instead of the normal twenty minutes. This signals the user that the battery is going dead and should be charged before further use.

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The Switched Outputs are each switched by relays in the **BLOCK**. Four of these circuits are operated by the push button switches and turned off when the ignition goes off and by a twenty minute timer. This timer is reset by an opening of a door or ignition. The ignition holds the timer in reset, so these outputs will stay on all the time the ignition is on. These outputs will all be shut off when the ignition is turned off. If they are turned on after the ignition is turned off, they remain on for twenty minutes.

The timer has two speeds which are dependent on the incoming battery voltage. If the battery is higher than 12.1 volts, the clock runs at its normal speed. If the battery drops below 12.1 volts, the clock speeds up approximately 10 times so the timer will shut off in about 2 minutes instead of the normal 20 minutes.

Lights 1 and 2 as well as the Courtesy Light Output, are also controlled by the door pin switches to provide the courtesy light feature. They will come on when a door is opened and stay on for twelve seconds after all the doors are closed. If any door is left opened, the lights will automatically turn OFF in twenty minutes. To turn them ON again, *ALL* doors must be closed in order to reset the **SMART FUSE BLOCK** and then resume operation.

All the switch panels operate from a common three wire cable. These wires are used for back lighting, ground, and switch signal. The **SMART FUSE BLOCK PLUS™** switches loads by monitoring the voltage on the signal wire. A resistor in the **BLOCK** is used to pull the signal line to 12 volts. The switch panels have various values of resistors associated with each function. When one of the switches is pressed, the voltage on the signal wire is dropped to a level that corresponds to that function. Circuitry in the **BLOCK** senses the voltage and switches that function on or off.

### BATTERY & IGNITION CIRCUITS

The Battery and Ignition circuits are *NOT* controlled by the **SMART FUSE BLOCK PLUS™**. Power to these outputs is brought into the fuse block from the OEM wiring and is fused on the **BLOCK**.

The Battery fuses are used for circuits that feed intermittent or un-interruptible loads, such as power sofa and 12 volt outlet, which may be used to supply a 12 volt cooler. The Ignition fuses are used for circuits that feed loads that should operate only when the ignition is turned on, such as the rear fan.

The timer has two speeds which are dependent on the incoming battery voltage. If the battery is higher than 12.1 volts, the clock runs at its normal speed. If the battery drops below 12.1 volts, the clock speeds up approximately 10 times so the timer will shut off in about 2 minutes instead of the normal 20 minutes.

### COURTESY LIGHTS

When the doors are opened, Lights 1, Lights 2, and the Courtesy Lights circuits are turned on. This function is operated by a timer that keeps the lights on while the doors are opened and for up to 12 seconds after they are closed. If the ignition is turned on during this 12 seconds, the Lights go out immediately. The timer gets its signal from the OEM dome light circuit. The dome light circuit is brought into the module via a two pin plug, J2. When a door is opened, a voltage appears between these two pins. (The circuitry will accept either polarity of voltage at this plug.) When 12 volts is sensed by the **SMART FUSE BLOCK PLUS™**, it turns on the Courtesy Light function. When the doors are *ALL* closed, the Courtesy Light Timer begins to run, holding the lights on for 12 seconds. If the ignition is turned on during this period, the lights will go out immediately.

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### FUSES

The fuses used are standard, plastic "ATO", blade (automotive) type.

There are 10 positions for the fuses in the module.

The 10 fuses and their sizes are as listed:

<u>Circuit</u>	<u>Fuse Number</u>	<u>Fuse Size</u>	<u>Connector Pin-Out</u>	<u>Power Source</u>
Spare Battery	F1	20 Amp	J5 - 5	Battery
Courtesy Lights	F2	7.5 Amp	J5 - 4	Battery
Lights 1	F3	7.5 Amp	J5 - 3	Battery
Lights 2	F4	7.5 Amp	J5 - 2	Battery
Spare Battery	F5	10 Amp	J5 - 1	Battery
TV/VCP	F6	7.5 Amp	J4 - 4	Battery
Lights 3	F7	7.5 Amp	J4 - 3	Battery
Spare Ignition(Rear Fan)	F8	20 Amp	J4 - 1	Ignition
Spare Ignition	F9	15 Amp	J4 - 2	Ignition
Panel Back Lighting	F10	1 Amp	J7 - 1	Switched Outputs & Ignition

### **PLUGS - PINS & FUNCTIONS**

**J1** - .250 Male Faston - Power Ground (SFB + electronics carry < 2 Amps)

**J2** - 2 pin in-line Mate-N-Lok Mating Housing AMP 1-480698-0

<u>Pin</u>	<u>Function</u>
1	From OEM Dome Light
2	From OEM Dome Light

**J3** - .250 Male Faston - Ignition Power input

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**J4** - 4 pin in-line Mate-N-Lock Mating housing AMP 1-480702-0

<u>Pin</u>	<u>Function</u>	<u>Fuse</u>
1	Rear Fan Power	F8
2	Spare Ignition	F9
3	Lights 3 Output	F7
4	TV/VCP	F6

**J5** - 5 pin in-line Mate-N-Lock Mating housing AMP 1-480763-0

<u>Pin</u>	<u>Function</u>	<u>Fuse</u>
1	Spare Battery	F5
2	Lights 2 Output	F4
3	Lights 1 Output	F3
4	Courtesy Lights Output	F2
5	Spare Battery	F1

**J6** - .250 Male Faston - Battery Input

**J7** - 3 pin KK156 - Mating housing Molex 09-50-8033

<u>Pin</u>	<u>Function</u>	<u>Fuse</u>	<u>Wire Color</u>
1	Panel Back Lighting	F10	
2	Switch Signal		(YEL)
3	Switch Panels Ground		(BRN)

## SWITCH SIGNAL VOLTAGES

To turn a light or TV on or off, the voltage on the signal line is changed by pressing one of the switches on a switch panel. Each function has a corresponding voltage associated with it. They are as follows:

<u>Function</u>	<u>Voltage</u>
Lights 2	5.7 volts
Lights 3	3.5 volts
Rear Radio/TV/VCP	2.1 volts
Lights 1	1.1 volts

Measure signal voltages between pins 2 + 3 of J7. (The voltages in the table are as measured with battery input at 12.7 volts. The switch voltages are a percentage of battery voltage and will track with other battery voltages.)

# **SMART FUSE BLOCK PLUS™**

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### **TROUBLE SHOOTING**

#### **BATTERY AND IGNITION CIRCUITS**

The OEM Battery and Ignition circuits are fused in the **Block**. Power for these circuits enters the **SMART FUSE BLOCK PLUS™**, is fused and fed to the connectors, without any control. If the rear fan, 12 volt outlet, vacuum, or sofa fail to operate, check the fuses, F1 20Amp, F5 10Amp, F8 20Amp, and F9 15Amp, using a test light. If any of these have failed, replace them with the same sized fuse. If these are all good, check the OEM power feeds coming into J6 and J3. Failure of these outputs would *rarely* be traced to problems in the **SMART FUSE BLOCK PLUS™**.

#### **SWITCHED OUTPUTS**

The Switched Outputs should operate each time a button is pressed, whether the ignition is on or off. To check their operation, press a button while listening for the relays in the **SMART FUSE BLOCK PLUS™** to click. The relays will operate even if the associated fuses are opened. Power for these circuits comes from the OEM battery circuit. If the relays don't operate, check for the presence of battery voltage at the module before going further. Each of the four switched circuits is fused individually. If there is a problem with a particular circuit, check the fuse associated with that circuit.

#### **COURTESY LIGHTS**

The Courtesy Lights output should be on when the doors are opened. If the doors are left opened for more than twenty minutes, they will go off. (If the ignition is on and the doors are opened, the timer will *NOT* turn the lights off.) To check this output, open the door and turn the ignition on. Power for this circuit comes from the OEM battery circuit. Check the Courtesy Light fuse and the presence of ignition and battery voltages before going further.

#### **SWITCH PANEL BACKLIGHTING**

The panel backlighting is fed by F10 (1Amp). The backlighting will illuminate when a door is opened, the ignition is on, or when a panel button is pressed.

# SMART FUSE BLOCK PLUS™

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### Problem

### Possible Cause/Solution

Lights or TV won't come on.

Fuses F3, F4, F6, or F7 7.5 Amp open. Check and replace fuse.

Listen for relays clicking in module when buttons are pressed. Clicking relays indicate module is working.

Faulty OEM battery feed. Check for power coming from the OEM battery feed at J6.

Check signal line for switch voltage on J7 - 2. Should be 12 volts and should drop when button is pressed. If not, check wiring and switch panel. Short signal line, J7 - 2, to ground, Lights 1 should switch.

If the above fail to fix problem, replace module.

Lights and TV won't go off when ignition is turned off.

Check ignition input at J3. Should be 12 volts with ignition on and 0 volts with ignition off.

Courtesy Lights won't come on when doors open.

Courtesy Light fuse, F2, open. Replace fuse.

Door pin switches not working. Check for 12 volts between pins of J2 when doors are open, or closed.

Check Courtesy Defeat Switch on dash (GM only)

Door pin switch stuck or shorted. Unplug J2, lights should go off in 12 seconds.

Check courtesy light switch on head light switch.

If the above fail to fix problem, replace module.

Check ignition feed. Should be 0 volts with ignition off. If not check ignition input wiring.

Check fuse F10. Replace if open.

If the above fail to fix problem, replace module.

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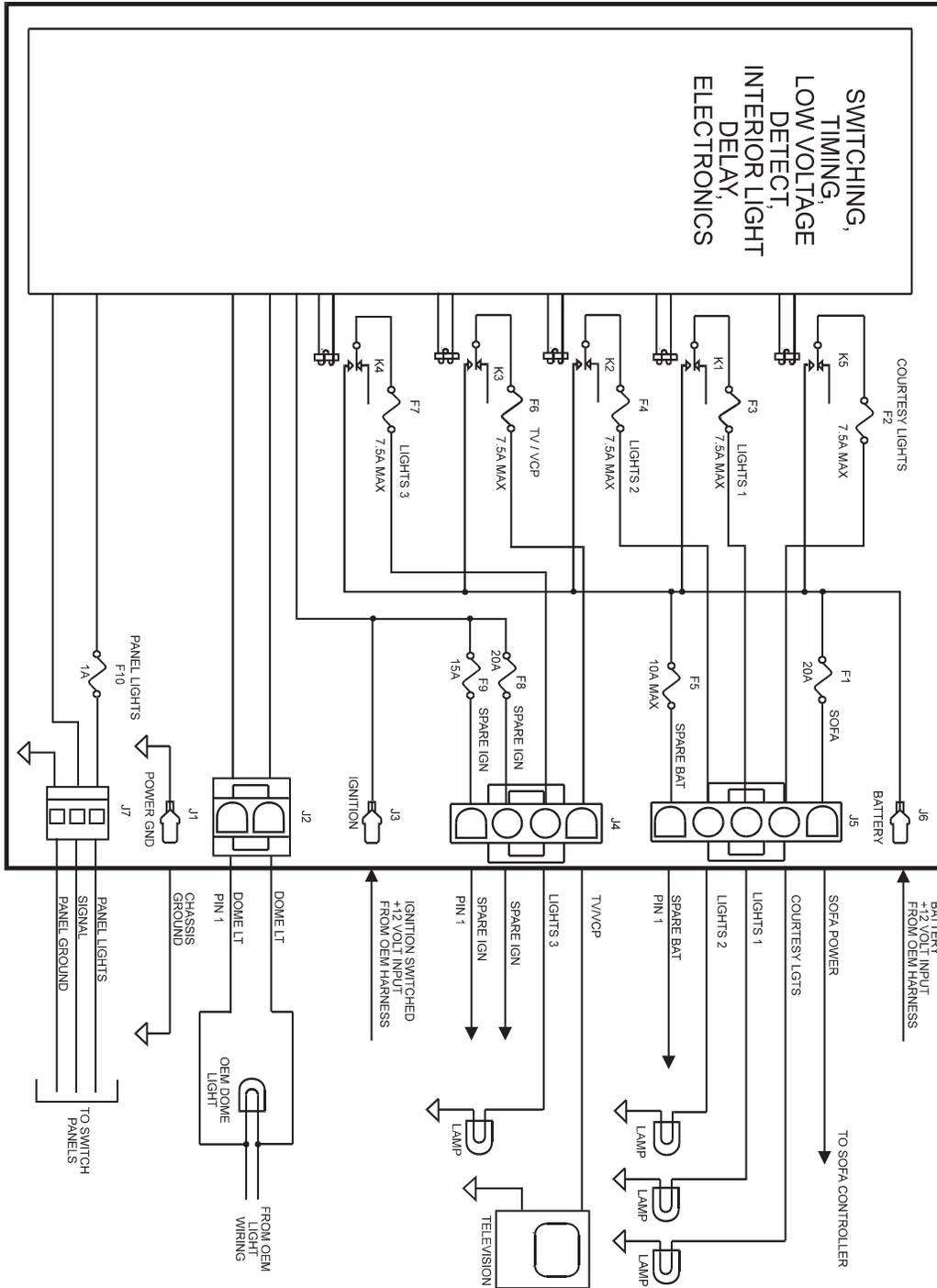


FIGURE 1