

OWNERS MANUAL

InPower Model SS-FD23

Electronic Start/Stop/Elevated Idle Control Module for Ford 2023 F250-F600

Contents

1. Introduction.....	2
2. Installation Procedures.....	3
3. Operation.....	6
4. Mechanical Drawing	10
5. Status LED and Troubleshooting.....	11
6. Installation Location.....	13
7. Start/Stop Ignition/BCM/SS-FD23 Wiring	16
8. Contact Information	16



1. Introduction

InPower's SS-FD23 Start/Stop/Elevated Idle Module provides Start/Stop Functions and an elevated Idle selection. This product is compatible with the 2023 F250-F600. It is designed to be mounted under the Steering column near the OBDII connector and the Trailer Brake Controller Module.

Modules come with various modes of control: Start, Stop, and two preset RPM speeds (one default setting and another selectable).

Note: The elevated idle functions will only operate if the **Chassis Ready Conditions** are satisfied. LED diagnostic indicators are provided to aid in system troubleshooting. These LEDs are located on the module opposite the connector.

Chassis Ready Conditions typically could be:

- No vehicle speed
- Accelerator not depressed
- Engine up to Operating Temperature
- Shifter in Park
- Service brake not depressed
- Engine running below base idle
- No Diagnostic Trouble Code (DTC). Check Engine light must be off.
- Other hindering conditions will be detailed in the Body Builder's Guide (www.fleet.ford.com/truckbbas/)

SS-FD23-01 - Special for Stellar Has Data Bus T-Harness

SS-FD23-02 Standard Product - Harness with Blunt Cut Wires DataBus T-Harness

SS-FD23-03 - T-Harness for DataBus with Short Blunt Cut Wires for all IO

SS-FD23-04 - Harness with T-Harness Ignition Connector

The **SS-FD23-02 kit** includes two cables.

The cable 1 connects the module to the SEIC Interface (Group 3) blunt cut wires, and connects to the Ignition Switch (Group 1) via Blunt Cut Wires for controlling the engine. Control Interface (Group 2) Blunt Cut Wires connect the control inputs and outputs for the SS-FD23-02 and to the PTO. Cable 1 also provides connections to Battery and Ground, and also provides decoded PARK and PARK BRAKE signals.

The cable 2 connects to the Trailer Brake Controller Module (See Page 12) and picks up the Data Bus via a T-Harness. This provides PARK and PARK BRAKE data to the SS-FD23-02 which provides discrete wires to the user for those signals.

The **SS-FD23-04 kit** includes two cables.

The cable 1 connects the module to the SEIC Interface (Group 3) blunt cut wires, and connects to the Ignition Switch (Group 1) via T-Harness for controlling the engine. Control Interface (Group 2) Blunt Cut Wires connect the control inputs and outputs for the SS-FD23-04 and to the PTO. Cable 1 also provides connections to Battery and Ground, and also provides decoded PARK and PARK BRAKE signals.

The cable 2 connects to the Trailer Brake Controller Module (See Page 12) and picks up the Data Bus via a T-Harness. This provides PARK and PARK BRAKE data to the SS-FD23-04 which provides discrete wires to the user for those signals.

Truck Body Builder Advisory Service:

www.fleet.ford.com/truckbbas/

1.1 Interface Selection

This section discusses the interface for the SS-FD23-02

1. The SS-FD23 needs to be located close to the Steering Column so that the wires that connect to the ignition switch RUN wire (Yellow-Group 1) to the RUN-IN and RUN-OUT (White-Group 1) can be connected easily. The Start Signal (Lt. Blue) goes to the START wire from the ignition switch.
2. The connection to the Data Bus via a T-Harness to the Trailer Brake Controller Module (Page 12) so it needs to be located close to it near the OBDII connector.
3. ENABLE (Pink, Group 2) is a 12V signal that will enable the SS-FD23 for operation and turn on the interfaces.
4. RPM1-Gnd Pulse (Tan, Group 2) requires a pulse to Ground to select RPM1, and a second Ground Pulse to turn RPM1 off (back to RPM STBY - Default).
5. RPM1-12V (Violet, Group 2) requires 12V to enable RPM1, and removing 12V from this line will turn RPM1 off (back to RPM STBY - Default). RPM Gnd Pulse (Tan) is not available as long as 12V is applied to this line.
6. START/STOP (Brown, Group 2) requires a pulse to Ground to Turn Engine On, and a second Ground Pulse to Turn the Engine Off. RPM is used to check Engine Status.
7. The Power Connections are Battery (Red, Group 2) rated at 15 Amps, and Ground (Black, Group 2) connected to Battery Ground.
8. Outputs
 - The PTO Interface is the PTO OUT (Orange, Group 2) 12V (10A Max) which turns on when SEIC PTO RLY goes to Ground.
 - U-IGNITION 12V (Yellow/Red, Group 2) remains on as Engine Stop (5A Max) is on. Turned ON/OFF when ENABLE is turned ON/OFF. This is for upfitter components needing to remain powered during a shut down sequence.
 - Decoded PARK (Dk Blue Group 2) and PARK BRAKE (White/Black Group 2) discrete wires are available as discrete wires (GND True). These reflect the current status of the PARK BRAKE and PARK for the vehicle and are enabled by the RUN (+12V True) line.

(Total for PTO and Ignition 12 should be less than 13A total)

9. SEIC Blunt Cut Wires
 - PTO_RLY (Lt Blue, Group 3) - PTO Relay
 - PTO REQ1 (Yellow/Green, Group 3) PTO Request
 - PTO RPM (Dark Green, Group 3)



Warning!



2. Installation

2.1 Safety Precautions

This electronic Start/Stop/Elevated Idle product has been designed and manufactured to meet the intended application requirements and specifications. Any modifications to the product or to the installation procedure can be dangerous and will void InPower's warranty.

- Read and understand the instructions in this manual and other manuals before starting the installation.
- **Make sure that the vehicle battery power is disconnected during the installation of the Start/Stop module.**
- **Reconnect the battery when the system installation is complete.**
- Wear appropriate safety equipment, such as protective eyeglasses, faceshield and clothing when installing equipment and handling the battery.
- Be careful when working near a battery. Make sure that the area is well ventilated and that there are no flames near the battery. Never lay objects on the battery that can short the terminals together. If battery acid gets in your eyes, immediately seek first aid. If acid gets on your skin, immediately wash it off with soap and water.
- Avoid disconnecting and making connections to the SEIC and PTO with the vehicle powered.

2.2 Getting Started

IMPORTANT NOTE: Once again! Please obtain the specific SEIC installation instructions for your vehicle model from Ford. Wire colors and locations may vary from model to model and even between different years for the same model. The guide may be obtained from **Ford's Body Builder Advisory Service.**
(www.fleet.ford.com/truckbbas/)

Carefully disconnect the battery before making any electrical connections.

2.3 Mounting

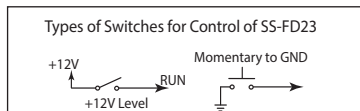
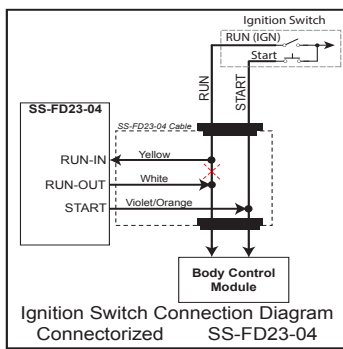
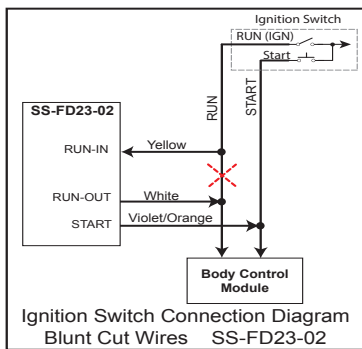
Mount the SS-FD23-02 module under the dash near the steering column.

2.4 Wiring

First, identify the GROUND Wire (Black, Pin12, Group 2) and connect it to a solid battery ground prior to any other connections.

Connect the 12V power (Battery, Red, Pin17, Group 2) to a fused battery feed (Battery still disconnected on the vehicle).

Proceed with connecting the Group1 wires to the Ignition switch (RUN-IN, RUN-OUT, and START) then connect the Group2 Wires to the Control Interfaces (descriptions called out in the 2.5 Control Interface section). Also refer to Section 7 Start/Stop Ignition/ BCM/SS-FD23-02 Wiring Page 16.



After termination of all wires, connect the the J1 cable to the SS-FD23.

2.5 Control Interface (Operation)

Determine the combination of two high idle speed modes needed (RPM1 and RPM-STBY).

The customer needs to supply switches for the ENABLE, START/STOP, and RPM1 modes. These modes are selected by wires in the Group 1 bundle.

The RUN-IN line provides power for the SS-FD23 and if not present, places the unit in an ultra low power state (micro Amperes).

The RUN-OUT line provides the control for the Body Control Module to indicate the Ignition is on to the Body Control Module that the vehicle is ready to start (if all conditions are conducive)

The ENABLE 12V line (Group 2 - Pink Wire) will take the Module out of StandBy when True. If Ignition is ON but Enable is not True, the SS-FD23 will monitor the Chassis Data Bus for status, but will not operate the Start-Stop, High Idle functions and outputs. If Enabled, removal of +12V from this Pin will shut off the High Idle, returning the engine to running at normal idle, turn off the outputs (except for PARK and PARK BRAKE), and will place the SS-FD23 in StandBy.

The RPM1 Trigger Gnd Pulse on this Wire (Group 2 - Tan) if in RPM STBY, will change the system to RPM1. A second Pulse to Ground will change the system to RPM STBY.

The RPM1 12V on this Wire (Group 2 - Violet) if in RPM STBY, will change the system to RPM1 as long as 12V is present. Removing 12V will return the unit to RPM STBY.

The START/STOP Switch is connected the START/STOP Input Wire (Group 2 - Brown Wire) to supply a Ground Pulse to Start the Engine (unit will enter into RPM STBY Mode). A second Pulse to Ground will Stop the Engine. RPM messages are used to verify Engine Status. The START/STOP LED indicates switch activity.

PARK - (Dk Blue - Group 2) A GND True decoded signal from the Data Bus that indicates the gearshift is in Park Position (Flashes if not in position). Output is enabled by the RUN line.

PB (Park Brake) - (White/Black - Group 2) A GND True decoded signal from the Data Bus that indicates if the Park Brake is set (Flashes if not set). Output is enabled by the RUN line.

Group 1					
Function	Wire Color	Connector P1 Pin #	Connection SS-FD23-02	Connection SS-FD23-04	Description
RUN-IN	Yellow	1	Blunt Cut	Connector	To the SS-FD from the Ignition Switch
RUN-OUT	White	11	Blunt Cut	Connector	Goes from the SS-FD to the Body Control Module
START	Violet/ Orange	14	Blunt Cut	Connector	Goes to the START Wire from the Ignition Switch

Group 2			
Function	Wire Color	Connector P1 Pin #	Function
ADJUST**	Lt Grn	3	Adjustment for RPM1 and RPM STBY
PARK	Dk Blue	4	Current State of PARK Output (GND True). Output available if RUN is True. (1A Sink Max)
ENABLE 12V	Pink	5	IN1- Enable 12V - Wakes up SS-FD23-02 and Enables Functions
RPM1 (GND)**	Tan	6	1st Gnd Pulse will select RPM1, 2nd Gnd Pulse will return the module to RPMSTBY
RPM1 (12V)**	Violet	7	12V activates RPM1 as long as it's present. This automatically masks out any selection by a GND Pulse on Pin 6 (RPM1(GND))
START/STOP	Brown	8	IN4- Start/Stop GND - Pulse to Gnd Starts Engine, 2nd Pulse to Gnd Stops Engine.
GND**	Black	12	Battery Ground connect to a solid Battery Ground.
Park Brake	White/ Black	13	Decoded Park Brake Out (GND True) - Current state of PB, Output available by RUN = TRUE. (1A Sink Max)
BATTERY**	Red	17	Battery +12Vdc connect to Battery +12 (Rated at 15Amps)
PTO OUT*	Orange	19	PTO Output connect to PTO Solenoid maximum 10 Amps (turns on when SEIC PTO-RLY goes to Ground)
U-IGNITION*	Yellow/ Red	20	Ignition that will remain on during engine stop (maximum 5 Amps) and is disabled by Enable (used for Upfitter Ignition dependent components)
* Total Current of PTO_OUT and IGNITION should not be > 13 Amps DC.			
** These wires are for use with setting remote variable RPM			

SEIC Group 3			
Function	SS-FD-02 Wire Color	P1 Pin #	Signal Output Level
PTO RLY	Lt Blue	2	Ground Active Indicates OK to Engage PTO
PTO RPM	Dk Green	10	0.4-4.5V
PTO REQ1	Yel/ Green	16	Positive (Out High 6)

PTO OUT (Orange Wire - Group 2) provides a connection to the PTO Solenoid capable of driving up to 10 Amps max (Note PTO OUT and U-IGN should never exceed a combined current of 13 Amps).

U-IGNITION - 12V Uninterrupted Ignition (Yellow/Red Group 2) is ON whenever ENABLE it ON and is used for support of upfitter components that may need to remain powered during the engine shut-down sequence.

The Power Connections are Battery (Red wire - Group2) rated at 15 Amps, and Ground (Black - Group2) connected to Battery Ground.

PTO RLY (PTO Relay) - (Lt. Blue, Group 3) Indicates the PTO Relay is OK to be engaged. LED Indicator flashes if not OK - Usually indicates problems with Chassis Ready Conditions.

SEIC PTO RPM (Dk Green Wire - Group 3)

SEIC PTO Req1 (Yellow/Green Wire - Group 3)

3. Operation

When the vehicle is parked and **Chassis Ready Conditions** are satisfied, the Start and Stop Functions and engine idle speed may be controlled by selection of one of the modes: START, STOP, RPM1 (RPM STBY is ON when ENABLE is ON, ENG ON is ON, and RPM1 is OFF). The preset RPM modes may be adjusted via applying +12V or GND to the gray RPM ADJUST wire (**RPM Adjustment Procedure**, page 8).

Chassis Ready Conditions:

- No vehicle speed
- Parking brake set
- Shift selector in Park
- Accelerator not pressed
- Service brake not pressed
- Engine running and at Base Idle
- No Diagnostic Trouble Code (DTC). Check Engine light must be off.

NOTE: While the engine is in high idle, should the throttle be deactivated by one of the Chassis Ready Conditions changing, the engine will return to normal speed. The throttle will flash the diagnostic LEDs to indicate the cause of the deactivation.

Modes of Operation:

Enable:

Description:

Once the module is powered up by turning on the Ignition, it waits in StandBy mode until a steady 12V enable signal is detected on the ENABLE input (Pink - Group2). Then the module detects if Engine is ON or OFF via the Data Bus Engine RPM message and goes to RPM-STBY if the Engine is ON. If the 12V enable signal is removed the module returns to the low power mode after turning off all outputs and all LEDs except the BUS ON (showing Bus traffic), and if the Engine is ON and High Idle is selected, it will also return to standard Idle speed.

If the RUN is on, then the PARK and PARK BRAKE Outputs will be present.

Engine Off/Start Section:

If the engine is OFF, the RUN is ON, and the ENABLE line at +12V, the module waits for an open circuit to ground transition on START/STOP (Brown - Group2) input and then runs the remote engine start routine. The START output will only be activated if the Park Brake status and the Shift Park position are both True. If a RPM Messages show engine activity, the module will transition to the Engine On routine. If RPM Messages do not indicate operation within 5 seconds, the module will return to engine OFF state.

Enable: Steady +12V on Enable (Pink-Group 2) Enables Module and Outputs

Start/Stop: A Pulse from Open to Gnd (Brown - Group 2) starts the Engine if the Engine is Off and the Chassis Ready Conditions are met, if Engine running, additional Pulse to GND will Stop Engine.

Engine On/High Idle Section:

After a 5 second delay for the engine rpm to stabilize (via RPM messages), the PTO REQ1 and PTO RPM outputs are turned on. The module now waits on an open circuit to ground transition on the PTO RLY input indicating the SEIC is active. The module now turns on the PTO output and the engine rpm is increased to the RPM STBY speed.

When the unit is on, the default RPM will be RPM STBY. If an open circuit to ground transition is detected on RPM1 input (Tan, Group2), the engine rpm is changed to the RPM1 set point. If another open circuit to ground transition is detected on the RPM1 input, the engine rpm is changed back to the RPM STBY speed.

Preset RPM Modes

Activation:

- When Off: Enable: Apply +12 V to Enable (Pink Wire - Group2)
Enables Unit
- Engine is OFF: A GND Pulse on Start/Stop (Brown Wire - Group 2)
Starts Engine and goes to RPM STBY (**Default High Idle** RPM).
- In RPM STBY: Apply GND Pulse to RPM1 (Tan Wire - Group2),
GND Pulse Select unit goes to RPM1.
- In RPM1: Apply GND Pulse to RPM1 (Tan Wire - Group2) and the
unit goes to RPM STBY.
- Or In RPM STBY: Apply 12V to RPM1 (Violet Wire - Group2),
+12V Select unit goes to RPM1 (locks out use of Tan Wire).
- In RPM1: Remove 12V from RPM1 (Violet Wire - Group2) and the unit
goes to RPM STBY.

Deactivation:

- In Any Mode: Removal of Enable 12V (Pink Wire - Group 2)
(*Engine Running*) Disables RPM1 or RPM STBY and Shuts Off High Idle
and goes to standard idle speed.
- In RPM1 or STBY: A GND Pulse on Start/Stop (Brown Wire - Group 2)
(*Engine Running*) Stops Engine (U-Ignition Remains ON)

Default RPM Settings **+/- 5% Tolerance (Ford Interface Dependent)**

- RPM-STBY - approx 870 RPM Gas, 950 RPM Diesel
- RPM1 - approx 1200 RPM Gas, 1500 RPM Diesel

Calibration Range: Varies based on vehicle model.
Generally, 900 RPM to 2200 RPM (gas) or 900 to 2800 RPM (diesel)

Both the RPM STBY set speed and the RPM1 set speed are adjustable using the ADJUST input. Any adjustments made will be automatically stored after an open circuit is detected on the RPM ADJ input for 5 seconds.

To Calibrate an RPM, Select the RPM and then apply +12V (up) or Gnd (down) to the RPM Adjust Input, (Lt. Green - Group 2).

RPM Adjustment Procedure:

1. Activate the mode desired for adjustment by Enabling the unit and then running at the RPM-STBY or by selecting RPM1 with a Gnd pulse on the RPM1 (Tan Wire - Group 2) Line or alternately by applying 12V to the Violet wire - Group 2 for RPM1.
2. Locate the ADJUST wire (Lt Green - Group 2) in the harness. Apply +12V to this wire to raise the RPM or to GND the wire to lower the RPM. For each second that +12V is connected to the RPM ADJUST wire (Lt Green, Group2), the RPM will increase by 50 RPM per second. Likewise, if the RPM ADJUST wire is tied to GND, the RPM will decrease at a rate of 50 RPM per second. Releasing it from either +12V or Ground will steady the RPM.

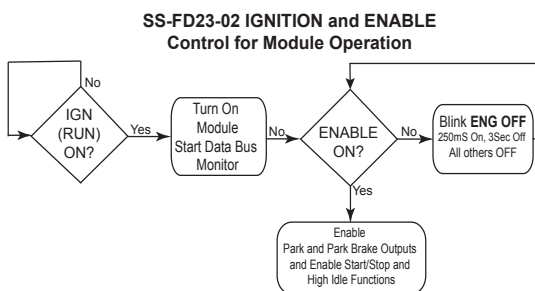
Note: For each bump of less than a half second, the RPM will move by 25RPM up or down (depending on whether Adjust is bumped to +12V or GND). If connected to +12V or GND for a second (or more) it will increase by 50RPM for each second the Adjust is connected to the voltage.

The new RPM Value is automatically saved after Five (5) Seconds

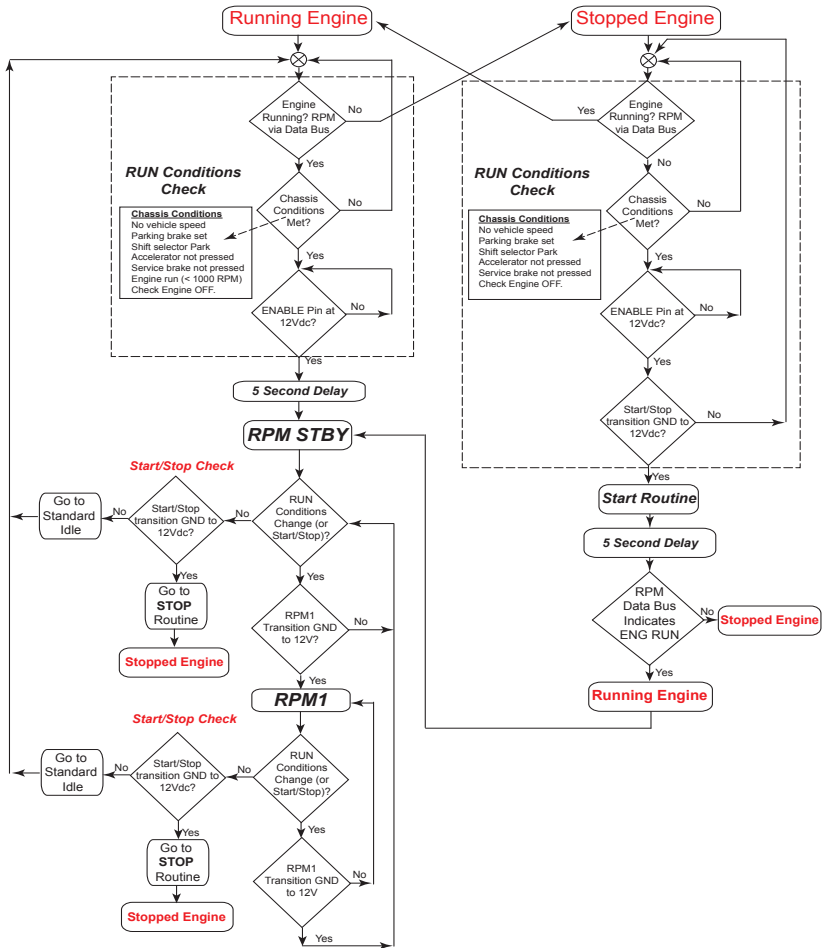
Note 1: A minimum of 910 RPM is recommended for PTO to activate.

Uninterrupted Ignition Output:

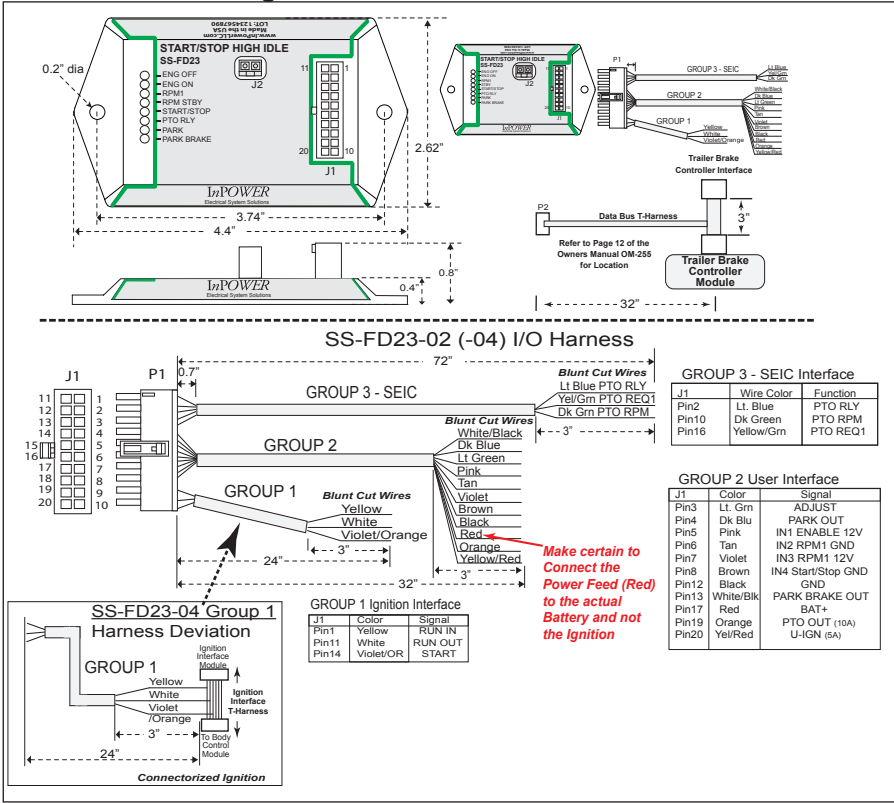
During the engine start and stop routines, the ignition run feed is turned off which also turns off the ignition power to the upfitter switches. The Uninterrupted Ignition Output (Yellow/Red Wire, Group 2) provides a 12V output for equipment that needs a continuous ignition signal. This output is rated at 5A.



SS-FD23 SW Operational Flow Chart



4. Mechanical Drawing



5. Installation and Troubleshooting

5.1 Please refer to the Throttle Selector Guide found on our website for the most up-to-date compatibility information.

(www.inpowerdirect.com/electronicthrottlecontrols_selector.php)

5.2 Check all wiring and make sure all connectors are plugged in firmly.

Refer to the Harness Wire Chart in Section 4 Mechanical, and check that wires are connected to appropriate inputs and outputs.

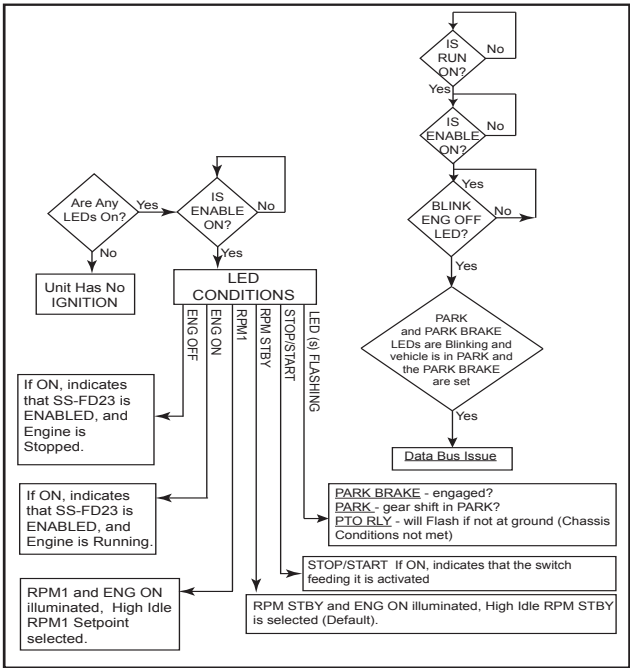
Ford vehicle wire colors and locations may vary substantially between different models and even different model years. **Please obtain and consult the SEIC information for your specific vehicle.** Documentation may be obtained from Ford's *Truck Body Builder Advisory Service* (www.fleet.ford.com/truckbbas/).

5.3 A series of 8 LEDs on side of the module provide diagnostic information for troubleshooting purposes. The LEDs are labeled and correspond to RPM modes and safety interlocks necessary to bring the vehicle to high idle. If no LEDs are illuminated, the unit does not have power from RUN.

See LED Troubleshooting Flowchart.

5.4 While engine is in high idle, if one of the Chassis Ready Conditions changes state, the engine will return to factory idle. The unit then will flash the diagnostic LEDs (PTO RLY, PARK, or PARK BRAKE) to indicate the cause of the high idle deactivation. Then, once conditions are restored, after a ten second delay, it will return the vehicle to the preset high idle speed. This feature may be used to troubleshoot intermittent problem.

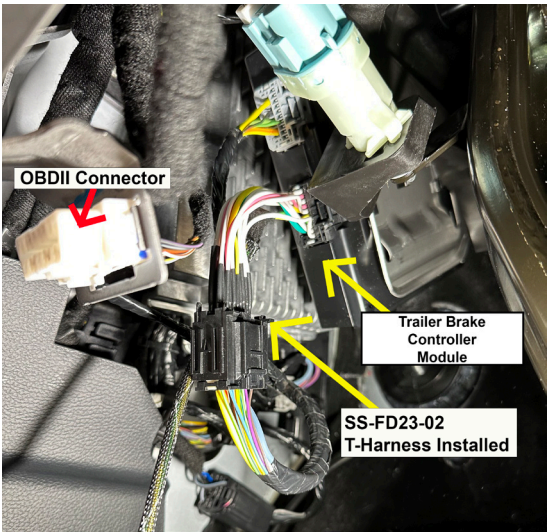
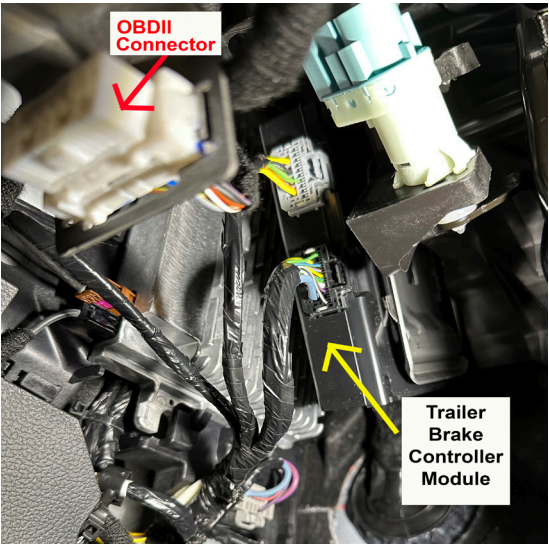
5.5 LED Troubleshooting Flowchart



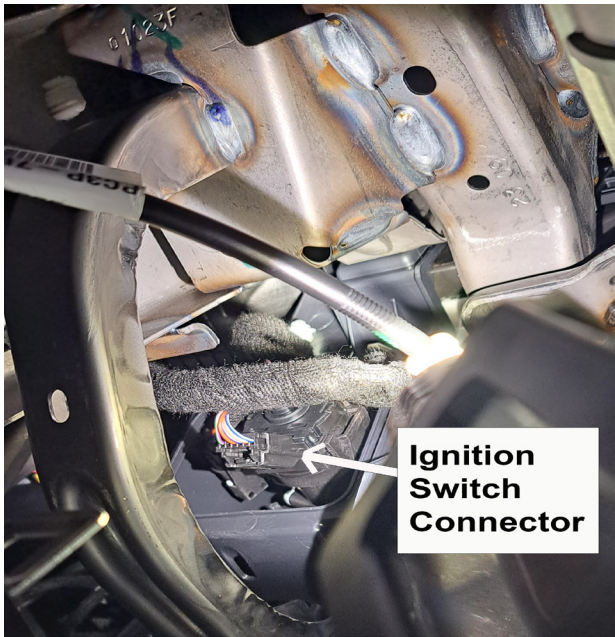
SS-FD23-02 LED INDICATORS

- | | |
|------------------------------------|---|
| <input type="radio"/> — ENG OFF | — On if engine is stopped (Blinks if RUN but No ENABLE) |
| <input type="radio"/> — ENG ON | — On if engine is running |
| <input type="radio"/> — RPM1 | — On if high idle is using the RPM1 set point |
| <input type="radio"/> — RPM STBY | — On if high idle is using the rpm standby set point |
| <input type="radio"/> — START/STOP | — Indicates the START/STOP input is activated |
| <input type="radio"/> — PTO RLY | — On if PTO RLY is at ground, flashes if not |
| <input type="radio"/> — PARK | — On if shifter in park, flashes if not in park |
| <input type="radio"/> — PARK BRAKE | — On if park brake set, flashes if not set |

Trailer Brake Controller Module Location (Data Bus) T-Harness

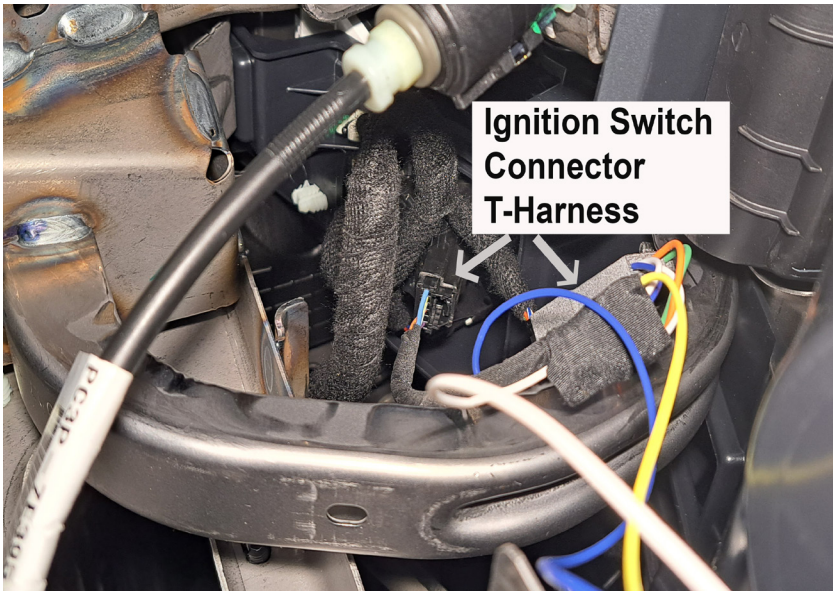
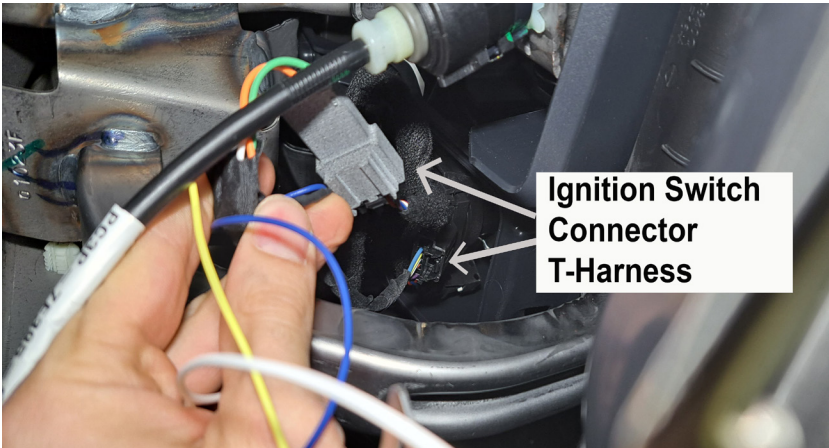


Ignition Switch Connector for IGN T-Harness



**Ignition
Switch
Connector**

Installation of Ignition Switch T-Harness



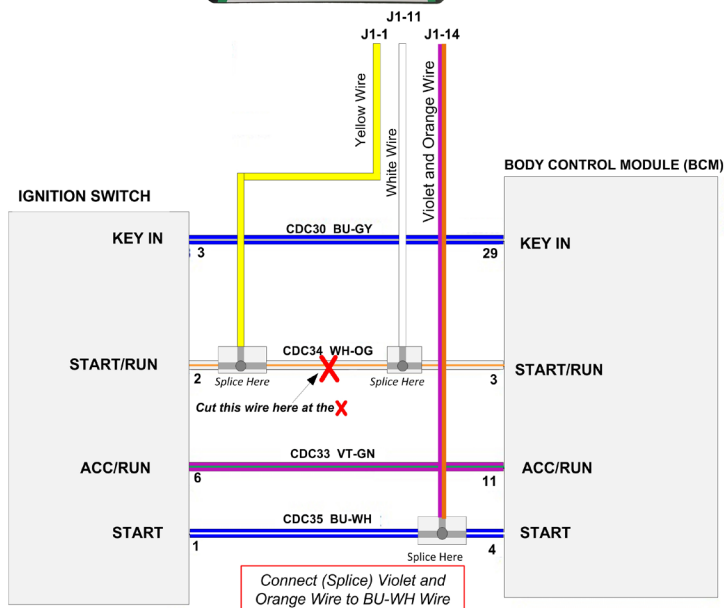
SS-FD23-02 Start/Stop Wiring Installation (Ignition Switch)

Start/Run Wire = Cut Wire (CDC34 WH-OG) START/RUN

Splice Yellow Wire from SS-FD23-02 to wire running to **Ignition Switch (Pin 2)**

Splice White Wire from SS-FD23-02 to wire running to **Body Control Module (Pin 3)**

Start Wire = Splice Violet/Orange wire from SS-FD23-02 to CDC35 BU-WH (START Pin 1 **Ignition Switch** and START Pin 4 **Body Control Module**)



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