

# OWNERS MANUAL

## SEIC Stand Alone Throttle for Models:

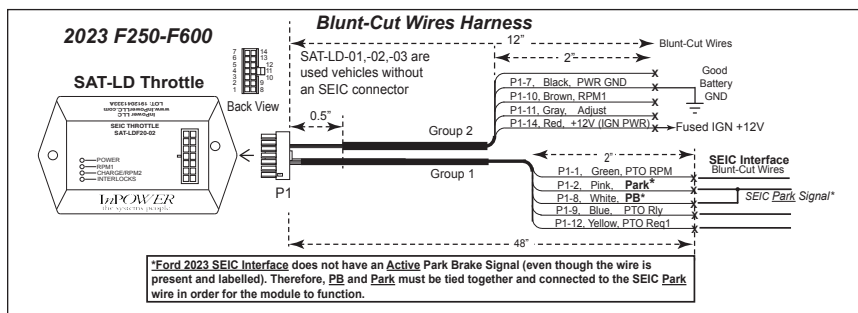
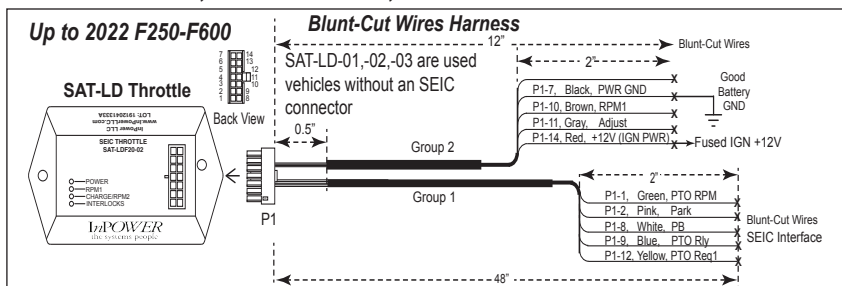
**SAT-LD-01**  
**SAT-LD-03**

**SAT-LD-02**

See: [http://www.inpowerelectronics.com/throttle\\_selector](http://www.inpowerelectronics.com/throttle_selector)



The **SAT-LD-01,-02,-03** is designed for vehicles without an SEIC connector such as the **2020+ Transit**, the **2021 E-Series**, and the **2021 F650-F750**.



## 1. Product Description

InPower's SAT-LD SEIC Throttle provide high idle engine RPM control for light-duty vehicles. The control module connects to the vehicle's SEIC interface via blunt-cut wires and for the operating mode inputs and the speed adjustment.

Four light duty models are available, each providing two operating modes:

**SAT-LD-01** Adjustable Preset RPM1 and *Green Charge*. Inputs activated by ground. RPM1 has priority and will override any other settings.

**SAT-LD-02** Adjustable Presets RPM1 and RPM2. Inputs activated by +12 volts. RPM1 has priority.

**SAT-LD-03** Adjustable Preset RPM1 and *Green Charge*. Inputs activated by +12 volts. RPM1 has priority.

**Note:** Modules are programmed to prevent high idle unless the Chassis Ready Conditions are satisfied. These are governed by checks by the SEIC and by the interlocks provided to the SAT-LD (Parking Brake and Park).

LED diagnostic indicators are provided to aid system troubleshooting. These indicators are located on the top of the module. (See Sections 5 and 6)

InPower provides product customization for the SAT-LDF20 SEIC series throttles. These units will carry a SAT-LDF20 or SAT-LD model designation, and a Lot number followed by a SPC number. The custom functions may deviate from this manual and may incur additional programming fees.

### 1.1 Presets

When PRESET1 (RPM1) is activated, the engine idle is raised to a preset RPM. The default RPM1 is 1500 for Diesel (1200 RPM for Gas). The SAT-LD-02 has a preset RPM2 instead of a Green Charge. The default RPM for Preset RPM2 is 900. Preset RPM1 and Preset RPM2 may be adjusted as needed. (See Section 4.) Preset 1 RPM1 overrides Preset 2, and Green Charge.

### 1.2 Green Charge

InPower's *Green Charge* is activated whenever RPM1 is not selected. The SAT-LD will then gradually raise the engine speed to 900RPM and then from 900 RPM to the minimum speed necessary to charge the batteries. Once the batteries are charged, the Green Charge mode will hold the engine idle at the minimum RPM necessary to maintain the charge, maximizing fuel economy and minimizing emissions.

## 2. Vehicle Applications

InPower designs the SAT-LD software to support many chassis and model year variations, and more will be added to the library as they are tested. To verify that your model is supported, please visit our Throttle Selector Guide on our web site ([www.InPowerLLC.com](http://www.InPowerLLC.com)). Enter the chassis and model year, and it will display the minimum software revision required for your chassis.

The software revision letter is the character following the throttle's 10 digit LOT code located on the label. If there is an SPC number, "SPC####" will be after the software letter. The SAT-LD throttle is re-programmable, and older models may be able to have their software updated (additional fees may apply).

## 3. Installation Procedures

### 3.1 Safety Precautions



This electronic throttle 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 installation of the throttle module.
- Reconnect the battery when the system installation is complete.

- Wear appropriate safety equipment, such as protective eyeglasses, face shield and clothing when installing equipment.
- Be careful when working near a battery. Make sure that the area is well ventilated and that there are no ignition source 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.

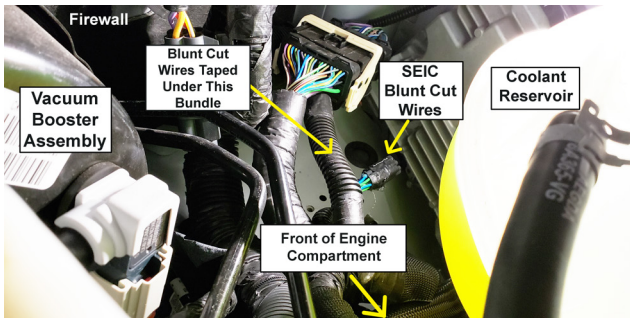
## 3.2 Getting Started

**3.2.1.** The recommended location for the SAT-LD throttle module is under the right side of the dash due to the proximity of the wiring connections, cable length and SEIC Connector. **Do not locate the unit in the engine compartment or any location that is not protected.** You will need a crimping tool and terminals to terminate wires to the provided blunt-cut wires.

**3.2.2.** Mount the SAT-LD throttle under the dash using two #6-32 screws. Ensure that you have sufficient distance to install the supplied SEIC and connector.

**3.2.3.** Install the SEIC cable. One end plugs into the 12-pin connector on the SAT-LD throttle module. The Group 1 Blunt Cut Wires terminate all terminate on the corresponding SEIC blunt cut wires under the hood.

The Figure below should help identify the location of the SEIC Blunt cut wires in the 2020 Ford Transit Van.



**3.2.4.** Wire the customer-supplied speed mode inputs. These may be switches or wiring from circuits that supply +12 volts (or ground) when the desired mode is to be activated. See System Diagram for wiring the mode switches. Select the correct SAT-LD model in the diagram and wire the switch labeled To RPM1 to the Brown RPM1 Input blunt-cut wire. Wire the switch labeled To RPM2 to the Violet RPM2 Input blunt-cut wire. Be sure that the switches are wired to the +12 volts or ground per the diagram.

**3.2.6.** The installation is now complete. Start the engine and activate the Preset and Auto modes switches to verify proper operation. If the elevated idle speeds' default values need changing you will need to calibrate the preset speed. (See Section 4 for *Preset Speed Adjustment* instructions). If the system does not operate properly refer to Sections 5 and 6 for Troubleshooting and LED Diagnostic Indicators.



**Preset Mode** - The engine speed increases to a pre-adjusted preset speed value. Note that Model SAT-LD-02 has two individually adjustable presets, Preset 1 and Preset 2.

**Green Charge Mode** - When activated, raises the engine idle speed to 900 RPM and then gradually raises the speed to the point necessary to maintain battery charge. As the DC load varies on the truck, the RPM will raise or lower to maintain charge, maximizing fuel economy and minimizing emissions. The Green Charge is available on Models SAT-LD-01 and SAT-LD-03. These are automatically invoked if all chassis and interlock conditions are met and the battery is low. For charging, the throttle automatically increase the engine speed to 1,500 RPM for faster battery charging. It returns the engine speed to 900 RPM when the battery voltage indicates a normal charge.

**Startup:** To start the Throttle, turn on the ignition, and then select your RPM selection wire. If the Parking Brake is engaged and the Vehicle Shift lever is in Park the appropriate RPM LED should start to flash as the Throttle requests control from the SEIC. When the SEIC checks that all chassis conditions are met, it will respond and activates the PTO RLY line, the Throttle will stop Flashing the RPM1 (or RPM2 -02) LED and that LED should go solid.

**Preset Speed Adjustment (RPM1 or RPM2):** To change the preset speed RPM value, activate the desired preset mode by selecting either RPM1 or RPM2 and then put the appropriate voltage (+12V or GND) on the adjust wire. +12 volts will take the RPM up, or ground will take the RPM down (Speed Adjust Mode Gray Pin-11 blunt-cut wire). Apply + 12 volts to the adjustment wire to increase the speed or a GND to decrease speed.

With this application of voltage to the Adjust Wire, the engine speed will change at a rate of 50 RPM for each second the voltage is applied (you can also “bump” it in 25 RPM increments by applying the proper voltage for less than a second). When the desired speed is reached, remove the +12 volt or ground from the Adjust Wire and ten seconds after the removal of the voltage, the new RPM will be automatically stored as the new value.

Once desired RPM is set, insulate the (Adjust) gray wire conductor and bind it to the wiring harness with tape or a tie, to prevent accidental speed changes if wire should make contact with a ground.

**Charge Mode Note:** In Charge Mode, the adjustment wires adjust the Max RPM setting in the same manner as the adjustments in the other modes.

## 5. Troubleshooting

### 5.1. For new installations.

If none of the LEDs are illuminated (including the POWER) and the truck is running, check to make certain that Ignition Power +12V is supplied and/or that the GND is connected.

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

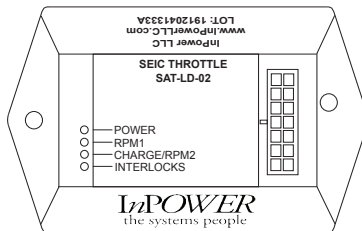
5.3. Check the LED diagnostic indicators. Refer to the LED Diagnostic Indicator table or the flow chart to determine the fault. The chart shows the various combinations of status indicator states and what they indicate about the throttle operation. Note that each LED can be Off, On Solid, or Blinking.

5.4. The default engine speed refers to state when all RPM inputs are true. RPM1 is the default engine speed on SAT-LD-01, SAT-LD-03. The default engine speed on the SAT-LD-02 is RPM2.

If you are referring to the table, find the row of the chart that matches and look under the 'Throttle Operation' column to determine the fault condition. If you are referring to the flow-chart, start where indicated and follow the paths corresponding to your answers to the various questions to determine the fault condition. We have provided both methods to aid both those who prefer tables and those who prefer a more visual approach.

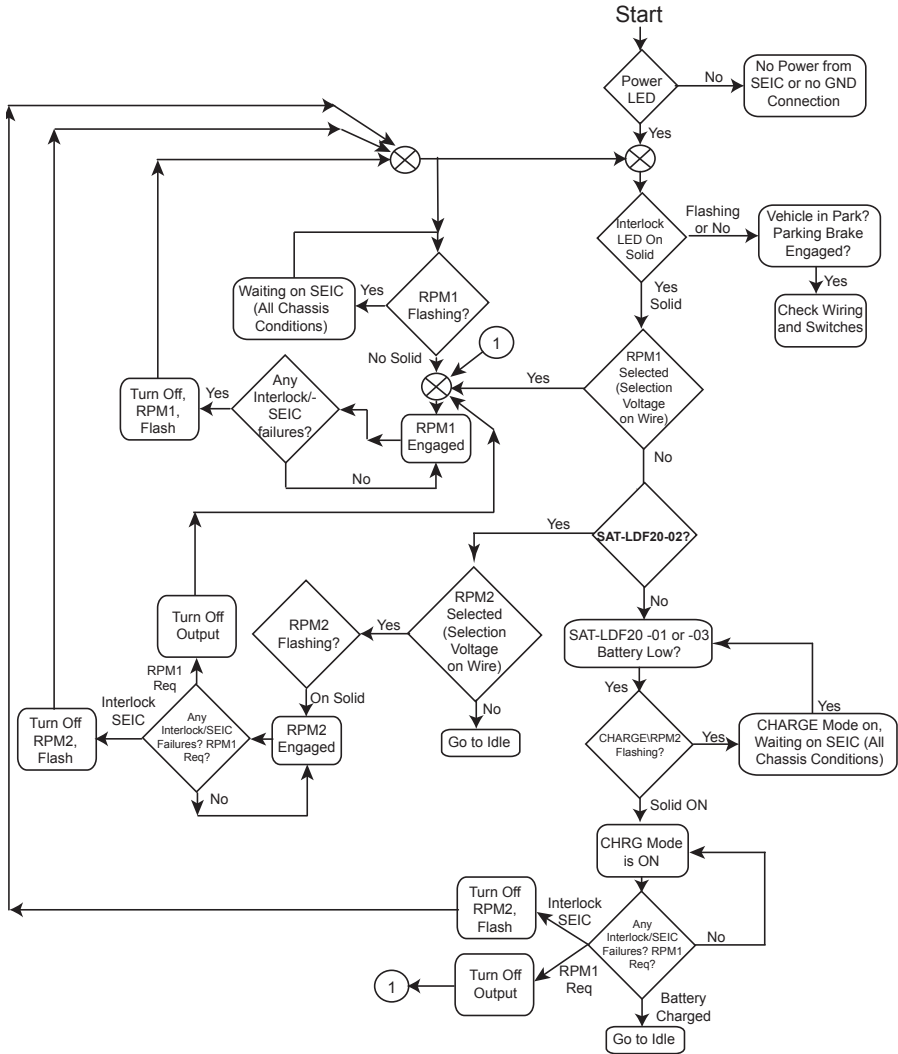
### 6. LED Diagnostic Indicators and Troubleshooting Chart

Looking at the Left side of the SAT-LD or SAT-LDF20, there are 4 LED Indicators for assisting in troubleshooting the operation of the SEIC Throttle.



<i>LED states:</i> Off - LED off    On - LED on solid    Blink - LED flashing					
POWER	RPM1	CHARGE/RPM2	INTERLOCK	THROTTLE OPERATION	ENGINE RPM
OFF	OFF	OFF	OFF	Off, 12V or GND power not connected	unknown
ON	OFF	OFF	Flash	Standby, Interlocks not engaged (Park and Park Brake)	idle
ON	OFF	OFF	ON	Standby, Interlocks engaged (Park and Park Brake)	idle
ON	Blink	OFF	ON	RPM1 selected, Interlocks engaged, waiting for SEIC engagement of PTO Rly (SEIC checking chassis Conditions)	idle
ON	ON	OFF	ON	SEIC Engaged PTO RLY, RPM1 selected and Engaged	1500 if default (Preset value)
ON	OFF	Blink	ON	RPM2 (LDF20-02) selected, Interlocks engaged, waiting for SEIC engagement of PTO Rly	Idle
ON	OFF	ON	ON	(LDF20-02) SEIC Engaged PTO RLY, RPM2 selected and Engaged	900 if Default (Preset value)
ON	OFF	Blink	Flash	RPM2 selected, Back to STBY, Interlocks are Parking Brake and or Park not TRUE	Idle
ON	Flash	OFF	Flash	Back to STBY, Parking Brake Not Set, RPM1 selected.	Idle
ON	OFF	Flash	Flash	Back to STBY, Parking Brake Not Set, (LDF20-02) RPM2 selected.	Idle
ON	OFF	Flash	ON	(LDF20-01 and -03), Low Battery, Waiting on SEIC to enter Charge.	Idle
ON	OFF	ON	ON	(LDF20-01 and -03), Low Battery, Interlocks and SEIC Engaged PTO-RLY Charge Mode	Charge RPM

# Operation Troubleshooting Guide





## 7. System Specifications

### Module Inputs

Power Input:	+12 volts is sourced from Pin 14 on the SEIC connector (on the SAT-LD the Red wire must be connected to fused IGN PWR +12V)
GND (All models):	Must be connected to a solid Battery Ground
RPM1 Input:	(P1-10, Blunt Cut - Brown) Ground to activate on Models SAT-LD-01 and +12 Volts to activate on Models SAT-LD-02 and SAT-LD-03
CHRG\RPM2 Input:	(P1-4, Blunt Cut - Violet) +12V to activate on Models SAT-LDF-02 (Not available on SAT-LD-01 OR SAT-LD-03)
Speed Adjust Input:	(P1-11 - Grey) Apply +12V to this wire to raise the RPM or ground the wire to lower it to the desired RPM. For each second that +12V is connected to the RPM Adjust wire (Pin 9), 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. <i>For each bump of less than a half second, the RPM will move up or down by 25RPM (depending on whether Adjust is bumped to +12V or GND). If connected to +12V or GND for a second (or more) it will change up or down by 50RPM for each second the Adjust is connected to the voltage.</i>
Parking Brake:	(P2-15 - White) Apply Ground to this wire to indicate that the vehicle has the Parking Brake applied.
Park:	(P2-14 - Pink) Apply Ground to this wire to indicate that the gear shift is in the Park position.
PTO RLY:	(P2-4 - Blue) the SEIC drives this to GND to indicate that the Chassis is now in PTO Mode.

### Module Outputs

PTO Req1:	+12 volts @ 3 amps (P2-7 Yellow). When the Interlocks (Park Brake ON and Gearshift in Park) are true, this output request to the SEIC Interface will be true. (SEIC responds with PTO RLY).
PTO RPM:	(P2-9, Green) This variable Voltage determines the speed at which the SIEC will command the Engine to run.
Adj RPM Ramp Rates Ford:	50 RPM per second (25 RPM for ea Bump less than 1/2 Sec)

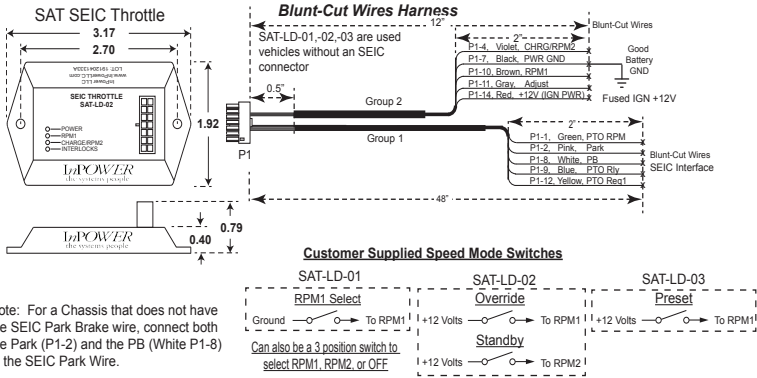
### Mechanical

Dimensions:	3.165 x 1.94 x 0.798 inches
Weight:	0.05 lb Module
Operating Temp:	-40° C to +85° C

## 8. Mechanical Drawing

### SAT-LD Harness SEIC

SAT-LD-01,-02,-03 are used on 2020+ Transit, the 2021 E-Series, and the 2021 F650-F750



Note: For a Chassis that does not have the SEIC Park Brake wire, connect both the Park (P1-2) and the PB (White P1-8) to the SEIC Park Wire.

### Factory Settings

Preset 1	1500 RPM(*ON)	Green Max(*ON)	1500 RPM
Preset 2	900 RPM(*ON)	On/Off Charge(*ON)	1500 RPM

## Ordering Guide - SAT-LD-xx blunt cut wire SEIC

Model	RPM1	RPM2	Activation Polarity	RPM1 Factory Setting	RPM2 Factory Setting	Highest Priority
SAT-LD-01	Preset	Green Charge	Ground	1500 Diesel 1200 Gas	N/A	RPM1
SAT-LD-02	Override Preset	Standby Preset	+12V	1500 Diesel 1200 Gas	1200 Diesel 910 Gas	RPM1
SAT-LD-03	Preset	Green Charge	+12V	1500 Diesel 1200 Gas	N/A	RPM1
SAT-LD-C	Custom Program					

## **Contact Us**

InPower LLC  
8311 Green Meadows Drive  
Lewis Center, Ohio 43035  
740-548-0965  
[www.InPowerLLC.com](http://www.InPowerLLC.com)