

OWNERS MANUAL

InPower Model DBT-MDF20

Electronic Throttle Module and Databus Decoder for Ford 2020+ Vehicles

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See: http://www.inpowerelectronics.com/throttle_selector

1. Introduction

InPower's DBT-MDF20 Data Bus Throttle both decodes the vehicle data bus to provide you with the signals you need and provides high idle engine RPM and PTO control. This product is compatible with 2020+ Ford trucks and vans equipped with the Ford Stationary Elevated Idle Control (SEIC).

Modules come with four modes of high idle control: one standby mode, two preset RPM modes, and one variable input RPM mode based on a customer-supplied remote variable resistor. The standard module also includes four data bus signal outputs: Park Brake Set, Reverse, Engine Run and Park (*note: on F750 chassis, the output is Neutral*) with the capability of additional or alternate outputs per customer special request. InPower Contact information is located on the back page of this manual.

Note: The data bus signal outputs will continue to function so long as the unit has power and vehicle ignition is in the run position. However, the throttle 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 connectors.

Chassis Ready Conditions typically could be:

- No vehicle speed
- Accelerator not depressed
- Engine up to Operating Temperature
- Service brake not depressed
- Engine running and below 1,000 RPM
- No Diagnostic Trouble Code (DTC). Check Engine light must be off.
- Within Temperature Limits as defined in Body Builder's Guide - **Minimum** Engine/Trans Temperature for PTO operation (limits seen in cold weather), **Maximum** Engine/Trans Temperature for safe operation (overheat Summer operation).
- Other hindering conditions will be detailed in the Body Builder's Guide (www.fleet.ford.com/truckbbas/)

The DBT-MDF20 kit includes two cables. The first cable (J1 Harness) connects to the module via connector J1 and has three labeled sets of 20-inch blunt cut wires: five wires for SEIC, five wires for inputs, and six wires for data bus signal outputs. The second cable (J2 Harness) connects to the module via connector J2 and has a 24 Pin SDLC Gateway connector and a set of seven blunt cut wires for remote high idle control and preset RPM adjustments. This Y-harness goes in place of the SDLC Gateway Plug where it plugs into the back of the SDLC Gateway (See Section 2.4). Likewise the SDLC Gateway Plug that plugged into the Gateway now should plug into the other connector in the SDLC Gateway T-Harness.

Note: 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 prior to installing the module.**

Documentation may be obtained from Ford's

Truck Body Builder Advisory Service:

www.fleet.ford.com/truckbbas/

2. Installation Procedures



WARNING

2.1 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, 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 the Gateway Connector when the vehicle is powered since that will result in a Fault Code being generated.

2.2 Getting Started

IMPORTANT NOTE: Once again! Please obtain the specific SEIC installation instructions for your vehicle make and 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/)

We recommend installing the DBT-MDF20 system under the dash near the SDLC Gateway due to the proximity of the wiring connections and cable length. The unit should not be located in the engine compartment or any other location that is not protected.

You will need tools to splice wires together. For each fixed preset mode, you will need a switch for selecting the Preset. It is possible to combine the Presets in a three position Center Off switch. For Variable RPM control, you will need a potentiometer. We recommend a 10 Kohm 3, 5, or 10-turn potentiometer such as those available from Digikey.

Do not lengthen the cable from the module to the SDLC Gateway Y Harness. Carefully disconnect the battery before making any electrical connections.

2.3 Mounting

Mount the DBT-MDF20 module under the dash or on a flat surface using the two mounting holes. Ensure that you have sufficient distance to install the 36 inch SDLC

Gateway Y cable that is part of the J2 harness.

Plug the J1 cable into the J1 connector (16 pin connector) and plug the J2 cable into the J2 connector (12 pin connector). The J2 cable will be used for the SDLC Y Gateway Connector, power input, and the remote RPM potentiometer (Accelerator) adjustment. The J1 cable will be used for hooking into the SEIC circuit, high idle on/off or mode select switches and for providing output signals.

2.4 Wiring

Ensure the J1 cable and the J2 cables are both connected to the module.

Note: If the vehicle is on and the unit has power, even if the Preset RPM functions are not engaged, the Databus Decoder signals will continue to operate. If the Databus Decoder signals will not be used, properly secure the Output wire group on the J1 harness.

A. Connecting the DBT-MDF20 to the Chassis

The Ford SDLC Gateway is the device which now provides the OBDII port for the customer, and is located in the same location as the conventional location for the OBDII port (Driver's side (Left)) under the Dash. The SDLC T Harness Plug inserts into the SDLC Gateway connector on the back side of the Ford SDLC Gateway. The Ford SDLC Gateway provides security for data requests from the Secure Data OBDII data bus connection to the outside world.



To connect the DBT-MDF20 to the system, unplug the SDLC Gateway to Chassis connector from the back of the SDLC Gateway, and Plug P2 of the DBT-MDF20 SDLC T-Harness into the Gateway where the Gateway cable connector was previously. Then connect the Gateway to Chassis Connector into P1 connector. This will provide access to Chassis GND and Chassis Data.

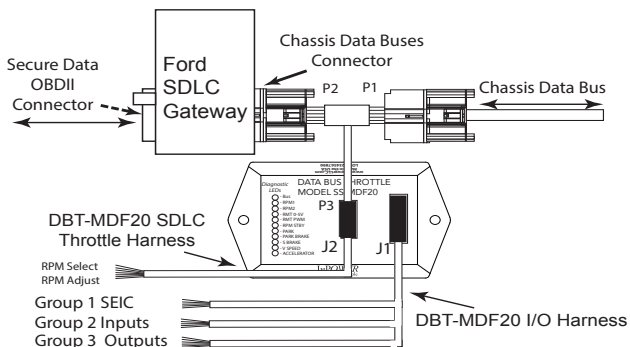
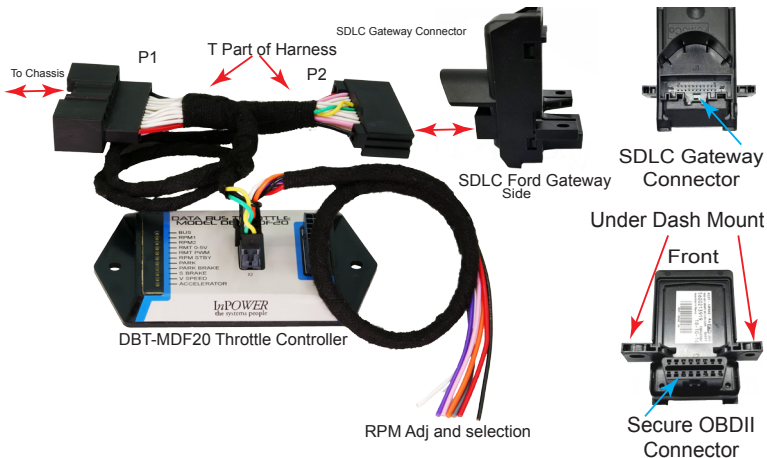
B. SEIC

Locate the Group 1 SEIC of blunt cut wires on the J1 harness. Install wires between the blunt cut wires provided on the J1 harness and the respective inputs and outputs of the Ford SEIC as shown in the wiring diagrams.

C. High Idle Mode Selection Controls

Determine the combination of high idle speed modes needed (standby high idle, variable RPM control and/or up to two additional fixed preset speeds).

The customer needs to supply a switch (or switches) for turning for selecting the RPM1 and/or RPM2 modes, and for the Remote variable RPM, needs to provide a 0 to 5V potentiometer. We recommend a three to ten-turn potentiometer such as those found at Digikey and other similar vendors. Alternatively this could be a 0-5V Accelerator Pedal.



Please refer to **Section 2.6** for a complete chart of input and output wires. All mode selection switches should be wired to the INPUTS wire group in the J1 Harness. The variable remote accelerator or potentiometer (if used) should be wired to the appropriate wires in the J2 Harness.

D. Decoded Data Bus Signal outputs

Note: As long as the unit has power (connected via the Red wire on the J2 harness) and the vehicle is on (data bus signals are not transmitted when the vehicle is off), the DBT-MDF20 will provide these output signals, regardless of the status of the throttle controls and engine RPM.

All decoded signal output wires are located in the J1 harness in the bundle marked Group 3 Outputs. Each wire corresponds to a different signal and all wires give a 600mA current when connected. (Note: The pink wire and the gray wire are unused in the standard model but may be given a custom signal at customer request.) Tape or otherwise properly secure any unused wires out.

Please see **Section 2.6** for chart.

2.5 Adjusting Values of RPM settings

All four RPM modes (RPM1, RPM2, RPM Remote Variable, and RPM Standby) come with Factory Calibrations but may be adjusted by the user if so desired once the module is installed.

1. Activate the mode desired for adjustment by connecting the corresponding line (Input RPM1, RPM2, RPM Remote, or RPM Stdby) to +12V. Note: If the **Remote Variable Accelerator RPM** mode is activated (Connector Pin 7 - Dark Blue), this process will adjust the **Maximum RPM** setting.
2. Locate the grey wire (Pin 9) in the J2 harness. 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.
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.
3. **To permanently store the changed RPM**, disconnect **ALL** Input RPM Mode selection lines but maintain power to the unit (powered by the Ignition Key Switch). If you disconnect the power without first deactivating all modes, it will not store the changed values.

Note 1: A minimum of 910 RPM is recommended for PTO to activate, so we do not recommend lowering the Standby RPM.

2.6 Harness Wires

J1 Harness

Group 1 SEIC	Wire Color	Connector Pin #	Description
	White	2	Input from PTO Relay/PTO
	Brown	8	Input from PTO VREF
	Orange	13	Output to PTO-REQ2 (<i>Not Used - Do not Connect!</i>) Except used on Older Gas
	Yellow	14	Output to PTO-REQ1
Green	16	Output to PTO-RPM	

J1 Harness (continued)

Group 2 Inputs	Wire Color	Connector Pin #	Function
	Brown	3	Not Used (Low2)
	Pink	4	Input RPM1 (High1) Overrides RPM2, RPM STBY, RPM Remote
	Tan	5	Input RPM2 (High2) Overrides STBY and Remote RPM
	Violet	6	Input RPM STBY (High3) Lowest Priority
Dark Blue	7	Input RPM Remote (High4) Overrides RPM STBY	

Group 3 Outputs	Wire Color	Connector Pin #	Function	Signal Output Level
	Dark Green	1	Park Brake Set	Ground (Out Low2)
	Pink	9	Not Used	Not Used (Out High 6)
	Tan	10	Veh. In Reverse	Positive (Out High 6)
	Violet	11	Engine Run	Positive (Out High 6)
	Dark Blue	12	Park (750: Neutral)	Positive (Out High 6)
Gray	15	Not Used	Ground (Out Low 1)	

J2 Harness

Wire Color	Connector Pin #	Function	Comments
Black	1	Ground	Gateway Connector
Black	2	Ground Out to Remote Accelerator Control	Blunt Cut *
Orange	3	Input From 0-5V (T1)	Blunt Cut *
Red	7	+12V Power Input	Blunt Cut
Violet	8	Not Used (V _{Aux})	Blunt Cut
Gray	9	RPM Adjust	Blunt Cut
Pink	10	Input (T2) Not Used	Blunt Cut
White	11	5V Output to Remote	Blunt Cut *

* These three wires are for use with remote variable RPM

Note: J2 gray wire may be used to adjust calibration for all RPM settings (See section 2.5)

3. Operation

When the vehicle is parked and Chassis Ready Conditions are satisfied, the engine idle speed may be controlled by selection of one of the four available modes: RPM1, RPM2, a variable RPM, and Standby RPM. The preset RPM modes may be adjusted via applying +12V or GND to the grey RPM Adjust wire (see **2.5 Adjusting Values of RPM Settings**, page 6).

Chassis Ready Conditions:

- No vehicle speed
- Parking brake set
- Shift selector in Park (or Neutral on F750)
- Accelerator not pressed
- Service brake not pressed
- Engine running and below 1000 RPM
- Within Temperature Limits as defined in Body Builder's Guide - **Minimum** Engine/Trans Temperature for PTO operation (limits seen in cold weather), **Maximum** Engine/Trans Temperature for safe operation (overheat Summer operation).
- 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 for five seconds after Chassis Ready Conditions are restored. Then it will reset and return the vehicle to high idle.

Modes of Operation:

Standby Mode

Function: Increase idle to minimum required to activate PTO
Activation: Apply +12V to Violet Wire on J1 Harness Input Group
Factory Calibration: 950 RPM

NOTE: A minimum of 910 RPM is required to enable PTO on 2020+ vehicles, so we do not recommend adjusting the Standby set-point below the Factory Calibration.

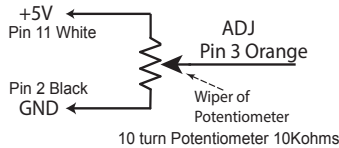
Preset RPM Modes

Function: Increase idle to preset RPM values
Activation: RPM1: Apply +12 V to Pink Wire on J1 Input Group
RPM2: Apply +12V to Tan Wire on J1 Input Group
Factory Calibration: RPM1: 1500 RPM RPM2: 1200 RPM
Calibration Range: Varies based on vehicle model. Generally, 900 RPM to 2200 RPM (gas) or 2800 RPM (diesel)

Variable RPM Mode

Function: Varies RPM as a function of voltage from customer-supplied remote variable control

Remote Control for Accelerator or Remote Accelerator Pedal



Activation and Adjustment:

1. Activate Standby Mode: Apply +12V to Violet Wire on J1 Harness Input Group (J1 Pin6)
2. Activate Remote Mode: Apply +12V to Dark Blue Wire on J1 Harness Input Group (J1 Pin7)
The module will then look for a signal from the remote potentiometer. The RMT 0-5V (and RPM-PWM LED) will flash until it receives a remote signal. At that point, the corresponding Remote 0-5V LED will turn solid (RPM-PWM should turn OFF).
3. To adjust RPM with the potentiometer, start at zero and then turn potentiometer up slowly until desired RPM is reached.

Minimum RPM: Equal to Standby Mode RPM

Maximum RPM: Preset Adjustable. Factory Default: 1500 RPM

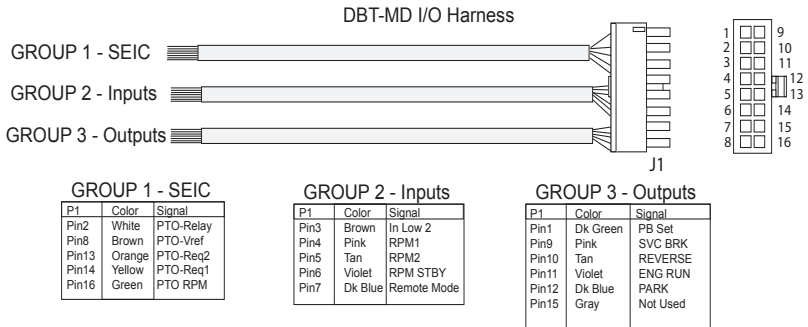
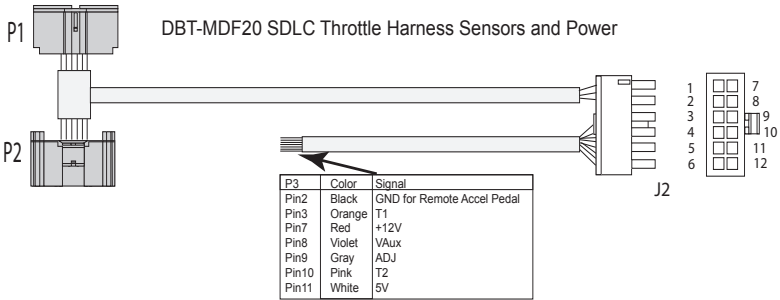
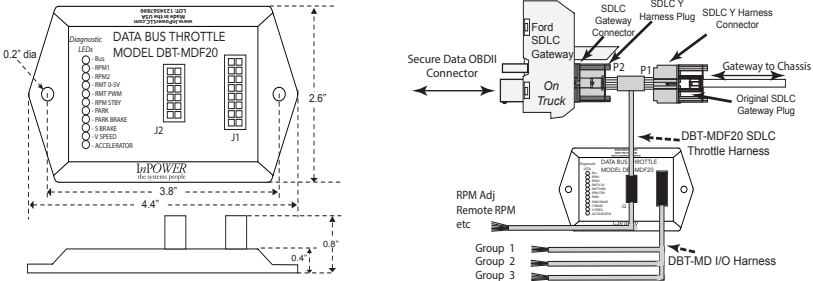
Mode Priorities:

If more than one mode is selected at a time, the modes take the following priorities:

RPM1	Highest - overrides all other modes
RPM2	Second - overrides lower modes
Variable RPM	Third - overrides lower mode
Standby	Lowest

Note: The one with the highest priority will over rule the lower priority settings. There are no restrictions if multiple modes are engaged simultaneously, for instance if Standby is engaged with RPM1 at the same time. If this is the case, then since it is a higher priority, RPM1 will engage. So in this way, Multiple modes can be requested at once with no problem with interference.

4. Mechanical Drawing



5. Status Indicators and Troubleshooting

5.1 For new installations. The throttle automatically checks to see if its software revision code supports the chassis. The DBT-MD detects the vehicle type during the first ignition turn-on after installation. If the Park LED is on solid and all other LEDs are off, the truck is not supported by this model.

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 2.5 on page 5 when checking 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 11 LEDs on top of the module provide diagnostic information for troubleshooting purposes. The LEDs are labeled and correspond to RPM modes, Databus status and safety interlocks necessary to bring the vehicle to high idle. If no LEDs are illuminated, the unit does not have power.

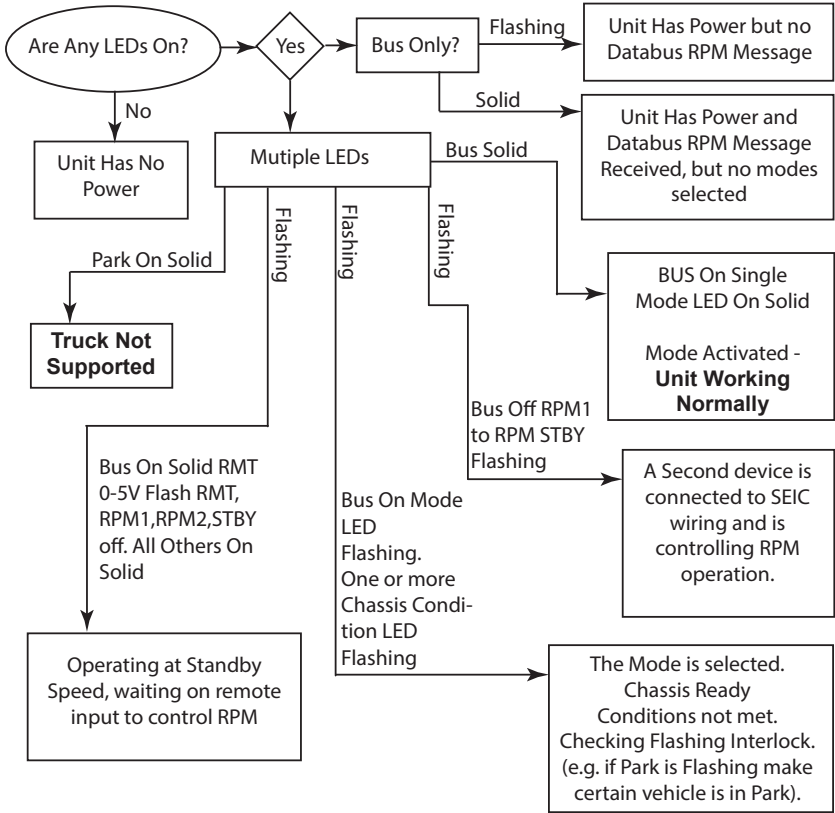
See LED Troubleshooting Flowchart on Page 13.

5.4 While engine is in high idle, if one of the Chassis Ready Conditions changes states, the engine will return to factory idle. The throttle will flash the diagnostic LEDs 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 problems.

DBT-MD LED INDICATORS

○	—	BUS
○	—	RPM1
○	—	RPM2
○	—	RMT 0-5V
○	—	RMT PWM
○	—	RPM STBY
○	—	PARK
○	—	PARK BRAKE
○	—	S BRAKE
○	—	V SPEED
○	—	ACCELERATOR

5.5 LED Troubleshooting Flowchart



Contact Us

InPower LLC
 8311 Green Meadows Drive
 Lewis Center, Ohio 43035
 740-548-0965
www.InPowerLLC.com