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## **AFIS II VS - (AFIS401VS) - Installation Instructions**

**Ford Econoline – All Engine Applications - 2005-2010**  
**Ford F250-550 - 5.4L Gas, 6.4 L Diesel, 6.8L Gas – 2008-2010**  
**GM/Chevy - 560/610 6.6L Diesel - 2006-2010**  
**GM/Chevy - 610 6.0L - 2008-2010**

It is not necessary to cut any OEM wires during the installation of the wire harnesses. Always disconnect the battery before installing any electrical devices.

*It is imperative that each harness be installed into the correct module connector, or damage to the module will result. The connections are color coded to assist with proper installation.*

The base Fast Idle RPM level is determined by the setting on the rotary DIP switch under the module lid. For Gas engine vehicles, the idle speed is 900 RPM with the switch in the "0" position and may be increased in increments of 100 RPM by each successive position on the switch. 1 = 1000 RPM, 2 = 1100 RPM, up to a maximum of 2000 RPM. Diesel applications start at 900 RPM and can be adjusted up to a maximum of 1500 RPM for GM and 1200 RPM for Ford. To adjust RPM, disconnect all connections to the control module; remove the module lid by removing the four screws. Adjust rotary DIP Switch to desired RPM level with a small screwdriver. Reinstall lid, connect module (see below) and test for proper RPM (see post installation instructions).

**CONTROL/LED DISPLAY PANEL (6-Pin Connector - Blue)** – Locate a suitable position on the dashboard, within view of the driver for the mounting of the Control/LED Display Panel. The length of the display harness is 40". This is the maximum distance the display can be from the Control Module. Drill a 3/4" hole in the dashboard where you wish the center of the display to be. Attach the blue taped end of the LED harness to the Control Module in the connector labeled in blue, "AFIS LED". Run the other end of the harness under the dash and out through the 3/4" hole. Attach the end of the display harness to the Control/LED Display Panel. Ensure panel is level, and secure using the supplied screws.

**DATA LINK HARNESS (6-Pin Connector - Red)** – Locate the vehicle Data Link Connector. It will be mounted below the lower dash panel on the driver's side. (See photo). Remove the 2 mounting screws for the Data Link Connector. Plug the red connector from the AFIS II VS Data Link Harness into the vehicle Data Link Connector. Ensure the connection is fully seated and secure with the supplied wire tie. Mount the black connector from the AFIS II VS Data Link Harness where the vehicle Data Link Connector originally was. Secure the Data Link Harness such that it does not hang below the lower dash panel. Plug the 6 pin connector from the Data Link Harness (red tape) into the connector labeled in red, "Data Link" on the Control Module. Attach the ground eyelet from the Data Link Harness to a known good ground.



## **AUTOMATIC TRIGGERING**

If automatic triggering of the Fast Idle is desired (see parameters in attached Operating Instructions), install the supplied jumper plug into the connector labeled in white, “Aux” on the Control Module. Do not install into the connector labeled in green, “I/O Port” or damage to the module can occur.

Finally, secure the control module behind the lower dash panel using 2-sided foam tape, self tapping screws, or wire ties. There are several mounting options, however, the module must not be installed in the direct flow of heater ducts, or too close to the engine compartment, as excessive heat can cause the module to reset.

### ***AFIS401VS Module Suggested Mounting - 2009 Ford Econoline***



- Mount the AFIS401VS module above the foam knee bolster, which is attached to the lower dash panel.
- Secure the control module using 2-sided foam tape.
- Verify that the harnesses are routed such that the tilt steering column will not contact them in the full down position.
- When installing the harnesses, leave several inches of take out such that the lower dash panel can be removed if necessary.

### ***AFIS401VS Module Suggested Mounting - 2007-2008 Ford Econoline***



- Mount the AFIS401VS module above the foam knee bolster which is attached to the lower dash panel.
- Secure the control module using 2-sided foam tape.
- Verify that the harnesses are routed such that the tilt steering column will not contact them in the full down position.

### ***AFIS401VS Module Suggested Mounting - GM/Chevy/F Series Applications***

- There are several mounting options, however, the module must not be installed in the direct flow of heater ducts, or too close to the engine compartment, as excessive heat can cause the module to reset.
- Secure the control module in its mounting location using 2-sided foam tape or screws.

**Reconnect the vehicle battery.**

**Check for proper operation (see Post-Installation Instructions).**



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## **AFIS II VS (AFIS401VS) – Optional Input / Output Plug**

The AFIS II VS has an optional I/O Port. This port is available to send or receive data with the vehicle body. Provided is a four pin connector (green) and 5 terminals (1 extra). The available Input/Outputs are shown below.

P1: 2.2Hz/mph - Connector Pin #1. This output is the vehicle speed reported in the same format as Ford's OEM vehicle speed signal. (2.2 Hz Per/MPH).

P2: Transmission Range = Park – Connector Pin #2. This output will provide a ground whenever the shifter is in the Park position.

P3: Transmission Fluid Temperature > 250 Deg F – Connector Pin #3. This output will provide a ground whenever Transmission Fluid Temperature is greater than 250 Deg F.

P4: F/I input – Connector Pin #4. This will allow fast idle activation from a location other than the standard AFIS LED Panel. This is accomplished by providing an external ground signal to this Pin from an external switch or device...

To install, crimp the desired circuits to the provided terminals and install them into the correct Pin location. The largest allowable wire that can be used with these terminals is 16GA. The pin #'s are located on the back of the 4 pin connector. Finally, snap the connector into the port labeled in green, "I/O Port". It is imperative that this harness be installed into the correct module connector, or damage to the module will result. Check for proper operation.

**Note: These circuits are designed for low current usage. The outputs can drive one standard automotive relay coil, but any current draw above 500 milliamps will result in damage to the AFIS II VS module.**



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## **AFIS II VS (AFIS401VS) – Post Installation Testing**

### **THE FOLLOWING PROCEDURE MUST BE PERFORMED TO VERIFY PROPER INSTALLATION:**

1. Place transmission in the “Park” position and start engine.
2. Verify LED prove-out on LED Status Panel. Both upper LEDs should illuminate for approximately two (2) seconds upon initial power on and then automatically turn off. (Check vehicle voltage if the Red “LOW VOLTAGE” LED remains illuminated. Vehicle voltage is being read as less than 12.5V). Vehicle voltage must remain above the minimum setting for the remaining steps.
3. Manually engage fast idle by pressing the Engage button on the LED display panel. If currently in automatic fast idle mode (only available if jumper plug is installed), press on service brake pedal while simultaneously pressing the manual engage switch. This will end the automatic fast idle. Then shift vehicle out of park and back into park and press the Engage button to enter manual fast idle mode.
4. Engine speed should increase to the set RPM level and the Green LED should automatically illuminate. If this does not occur, check for loose connections at the AFIS II VS Control Module or the vehicle Data Link Connector.
5. Depress the service brake for 1 second. Fast idle will temporarily stop anytime the brake pedal is depressed, but will automatically reengage after approximately 2 seconds once the brake pedal is released. Exit fast idle by depressing the service brake pedal while simultaneously pressing the manual engage switch. Fast idle should cancel and the Green LED should turn off.
6. Place wheel chocks at front and rear of one tire and set the Park Brake. Place transmission shift lever in the “Neutral” position. Attempt to manually engage fast idle. The system should not activate.
7. Place transmission shift lever in the “Park” position and turn off the engine.
8. Verify that all active LED’s turn off after a few minutes.
9. The AFIS II VS is properly installed only if it passes all of the above steps.
10. Fill out online warranty registration card at [www.intermotive.net](http://www.intermotive.net) and return to InterMotive Vehicle Controls.

*If any irregular operational issues persist, contact InterMotive Vehicle Controls at 530-823-1048 for technical assistance.*



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## **AFIS II VS (AFIS401VS) – Operating Instructions**

### **AFIS II VS**

The AFIS II VS is a sophisticated module designed to obtain real-time data from the onboard vehicle data port and use the received information for intelligent control applications. Ford/GM specific chassis data is obtained by communicating across the Ford/GM onboard Controller Area Network (CAN) data network.

The AFIS II VS is designed for both fixed and custom control applications. The fixed control application included in all AFIS II VS modules is an Advanced Fast Idle System (AFIS). Customization is available by way of an external 4-pin Input/Output port that is calibrated to meet each user's requirements.

### **AFIS II VS Operation:**

The AFIS II VS initializes when the vehicle ignition is on. During initialization, the LED display panel connected to the AFIS II VS performs a prove-out for 2 seconds. After the initialization, the AFIS II VS requests various vehicle data by sending data request messages across the OEM CAN diagnostic data network and all control logic is performed. When the AFIS II VS module has been running and the vehicle ignition is turned to the off or accessory positions, the connected LED panel remains illuminated in its last condition for a few minutes before the AFIS II VS module goes into a low current consumption "sleep" mode.

The AFIS II VS module obtains data from the onboard vehicle data port. In order to not interfere with a possible scan tool communication, the AFIS II VS will refrain from transmitting CAN messages for 10 seconds if a scan tool CAN communication is detected. If during these 10 seconds another scan tool message is received, an additional 10 seconds will be added to the end of the first 10 second timeout. When no scan tool messages have been received for at least 10 seconds, the AFIS II VS module will restart communication.

### **ADVANCED FAST IDLE**

The Advanced Fast-Idle System of the AFIS II VS includes Charge-Protect as well as Fully-Automatic and Manual engage modes. Charge-Protect is an optional automatic feature that maintains vehicle charging system voltage by increasing and controlling vehicle idle speed when necessary. Whenever charging system voltage falls below a minimum voltage (12.5V) for 2 seconds, this AFIS feature will increase idle speed and maintain fast idle until one of the safety conditions is no longer met or the voltage is raised above the minimum level. The Fully-Automatic and Manual engage modes also require that all safety conditions are met.



#### Safety conditions that must be met to engage or maintain Fast Idle operation

- Vehicle NOT moving (speed = 0 MPH).
- Service Brake NOT pressed.
- Vehicle Transmission Range in Park
- RPM inside of safe operating range.
- Transmission Fluid Temperature below 250° F.
- Engine Coolant Temperature below 230° F.

#### **Control/Display Panel:**

The Control/Display Panel consists of two LED's and a Manual Engage Switch. The red LED will illuminate whenever charging system voltage is less than 12.5V. The green LED will illuminate when Fast Idle is in progress. When the vehicle's ignition switch is first turned on, both LED's will illuminate for 2 seconds as a proveout of proper LED operation. The LED's are also used for diagnostic code retrieval by an authorized service technician. The Manual Engage Switch is used to manually engage Fast Idle operation if all safety conditions are met.

#### **Fast Idle Operation:**

Fast Idle may be initiated by either a manual or automatic Fast Idle trigger.

***For automatic triggers to be in operation, the 4 pin jumper plug must be installed into the “AUX” connector port on the control module (see installation instructions).***

The AFIS strategy can only command elevated idle when certain safety conditions are met (see section above). Fast Idle operation can be terminated by a safety condition violation, or an automatic Fast Idle disengagement trigger (if the optional jumper plug is installed). An automatic Fast Idle disengagement trigger will only act if the vehicle is in the particular type of automatic Fast Idle corresponding with the disengagement trigger. If an automatic Fast Idle is in progress and an automatic Fast Idle disengagement trigger occurs that would cause the Fast Idle to cease, yet there is a different pending automatic Fast Idle trigger, Fast Idle operation will NOT cease. In this case, automatic Fast Idle will continue under the new automatic Fast Idle triggering condition. If a Fast Idle Operation terminates due to an automatic Fast Idle disengagement trigger, automatic Fast Idle is available pending another automatic trigger. If a Fast Idle operation terminates due to a safety condition violation, automatic Fast Idle is unavailable until Park is de-asserted and re-asserted. (Shift out of Park and back into Park). If manual Fast Idle is triggered while Fast Idle operation is in progress due to an automatic Fast Idle trigger, the firmware will switch to a manual Fast Idle mode of operation.

The base Fast Idle RPM level is determined by the setting on the Rotary DIP switch under the module lid. For Gas engine vehicles, the idle speed is 900 RPM with the switch in the “0” position and may be increased in increments of 100 RPM by each successive position on the switch. 1 = 1000 RPM, 2 = 1100 RPM, up to a maximum of 2000 RPM. Diesel applications start at 900 RPM and can be adjusted up to a maximum of 1500 RPM.

- GM Diesel adjustable from 900-1500 RPM.
- Ford Econoline Diesel and F Series Diesel adjustable from 900-1200 RPM.
- Ford Econoline Gas, F Series Gas, and GM Gas adjustable up to 2000 RPM.

#### Manual Fast Idle Start Triggers:

- Manual Engage Switch.
- Fast Idle Input – ground applied to I/O Pin 4 of the AFIS II VS Module, such as an input from an external switch or device. (OPTIONAL)

Automatic Fast Idle Start Triggers (Only active if jumper plug is installed):

- Charge Protection - Battery voltage stays below 12.5V for 2 seconds and engine running for 5 seconds.
- Chassis A/C Boost - OEM A/C commanded on with ambient temperature above 70° F and engine running for at least 5 seconds.
- Heater Boost – Ambient air temperature below 70° F and Engine Coolant Temperature below 170° F.

Fast Idle Disengagement Triggers:

- Safety Condition Violation.
- Battery Voltage > 0.5 volts above 12.5V (Automatic Fast Idle Disengagement Trigger – Active only in Charge Protect mode).
- Engine Coolant Temperature > 190° F (Automatic Fast Idle Disengagement Trigger – Active only in Heater Boost mode).
- Open or battery voltage on I/O pin 4 while in Fast Idle caused by I/O Pin 4 fast idle input. (OPTIONAL)
- Transmission Fluid Temperature above 250° F.

**Note: Fast idle will temporarily stop anytime the brake pedal is depressed, but will automatically reengage after approximately 2 seconds once the brake pedal is released. Fast idle may be manually cancelled by depressing the service brake pedal while simultaneously pressing the manual engage switch**

**On 2009 Ford Econoline and F Series, Fast Idle will disengage if the accelerator pedal is depressed at any time.**

Manual Operation:

To manually engage Fast Idle, the manual engagement switch must be pressed for at least a quarter second and released. The Fast Idle operation will begin when the button is released, not when first pressed. Holding the switch for more than five seconds will initiate a diagnostic routine that displays stored status codes from previous operations. If the driver accidentally enters this routine, it can be exited by cycling the vehicle's ignition off and then back on. To exit Fast Idle operation, the driver can simply depress the service brake pedal while simultaneously pressing the manual engage switch.

***Note: When additional electrical or A/C loads are in use, engine RPM may drop. The AFIS feature will then raise the RPM back up to the fast idle speed. When the load is removed, engine RPM will increase. AFIS will then lower the RPM back to the fast idle speed. This may be more noticeable on cold engine startup.***



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## **AFIS II VS - (AFIS401VS) – Diagnostics**

Before beginning diagnostics make sure the technician has thoroughly reviewed the AFIS II VS installation instructions as well as the AFIS II VS operating instructions. Both are available on [www.intermotive.net](http://www.intermotive.net) or by contacting InterMotive at 530-823-1048.

### **LED's don't proveout on initial start-up.**

- Ensure LED harness is fully seated in AFIS II VS module.
- Ensure 6-Pin Data Link Connector is fully seated in the AFIS II VS module.
- Ensure Data Link Harness Connector is fully seated to the vehicle Data Link (below dash panel).

### **LED's flash alternately and fast idle does not operate.**

- No CAN communication with vehicle. Ensure 6-Pin Data Link Connector is fully seated in the AFIS II VS module. Ensure Data Link Harness Connector is fully seated to the vehicle Data Link (below dash panel).
- Vehicle does not have a valid VIN # in the powertrain control module (PCM). PCM must have proper VIN programmed in by OEM Dealer.

### **LED's proveout but vehicle will not enter, or does not complete Fast Idle mode**

- Verify all safety conditions are met.
- Check for Diagnostic Trouble Codes.

To display Diagnostic Trouble Codes on the Red LED, the technician must turn off the vehicle ignition, continuously press the manual engage switch while turning the ignition back on. Keep the switch pressed until the red and green LED's turn on and then off. The switch can now be released and codes can be retrieved. A 2-digit code is displayed by flashing the first digit, waiting one second, flashing the second digit, and then waiting four seconds before another code is displayed. For example, if the status code was 2-4, the Red LED would flash two times, be off for one second, flash four times, and then be off for four seconds. Codes in *Italics* are functional only if the associated option is included in the AFIS II VS calibration. If codes are received check all connections in the AFIS II VS system. These codes and their meanings are summarized in Table 1 on the next page. These codes are real time codes and may change due to changes on the vehicle.

<b>Code</b>	<b>Meaning</b>
1-1	Safety Conditions Met, Ready for First Fast Idle
1-2	Safety Conditions Met, Fast Idle Complete due to Vehicle Speed
1-4	Safety Conditions Met, Fast Idle Complete due to Transmission Fluid Temperature
1-6	Safety Conditions Met, Fast Idle Complete due to RPM
1-7	Safety Conditions Met, Fast Idle Complete due to Gear Position
1-8	Safety Conditions Met, Fast Idle Complete due to Service Brake
1-9	Safety Conditions Met, Fast Idle Complete due to Engine Coolant Temperature
1-10	Safety Conditions Met, Fast Idle Complete due to Battery Voltage > 13.0 V while in Charge Protection
1-11	Safety Conditions Met, Fast Idle Complete due to Cab A/C Commanded OFF while in Cab A/C Boost
1-13	Safety Conditions Met, Fast Idle Complete due to ECT > 190° F while in Heater Boost
1-15	<i>Safety Conditions Met, Fast Idle Complete due to Open or Battery voltage on I/O Pin 4 Fast Idle input</i>



2-1	Fast Idle In Progress Due to Manual Engage Switch
2-4	Fast Idle In Progress Due to Charge Protection (Battery Voltage < 12.5 V)
2-5	Fast Idle In Progress Due to Cab A/C Boost (Ford A/C ON with IAT > 70° F)
2-7	Fast Idle In Progress Due to Heater Boost (ECT < 170° F and IAT < 70° F)
2-8	<i>Fast Idle In Progress Due to grounded input on I/O Pin 4 (IF ENABLED AS A FAST IDLE INPUT)</i>
3-1	RPM too Low for Fast Idle
3-2	RPM too High for Fast Idle
3-3	Gear Position Incorrect for Fast Idle
3-4	Vehicle Speed Incorrect for Fast Idle
3-5	Service Brake Incorrect for Fast Idle
3-6	Transmission Fluid Temp too High for Fast Idle
3-8	Engine Coolant Temperature too High for Fast Idle
5-3	Valid VIN not detected
6-1	Ford CAN Network Communication Failure
9-1	Scan Tool Detected, Module Temporarily Disabled

Table 1: Diagnostic Trouble Codes

### **Vehicle intermittently drops out of Fast Idle mode, but currently works properly**

- Check for Fast Idle Stop Codes.

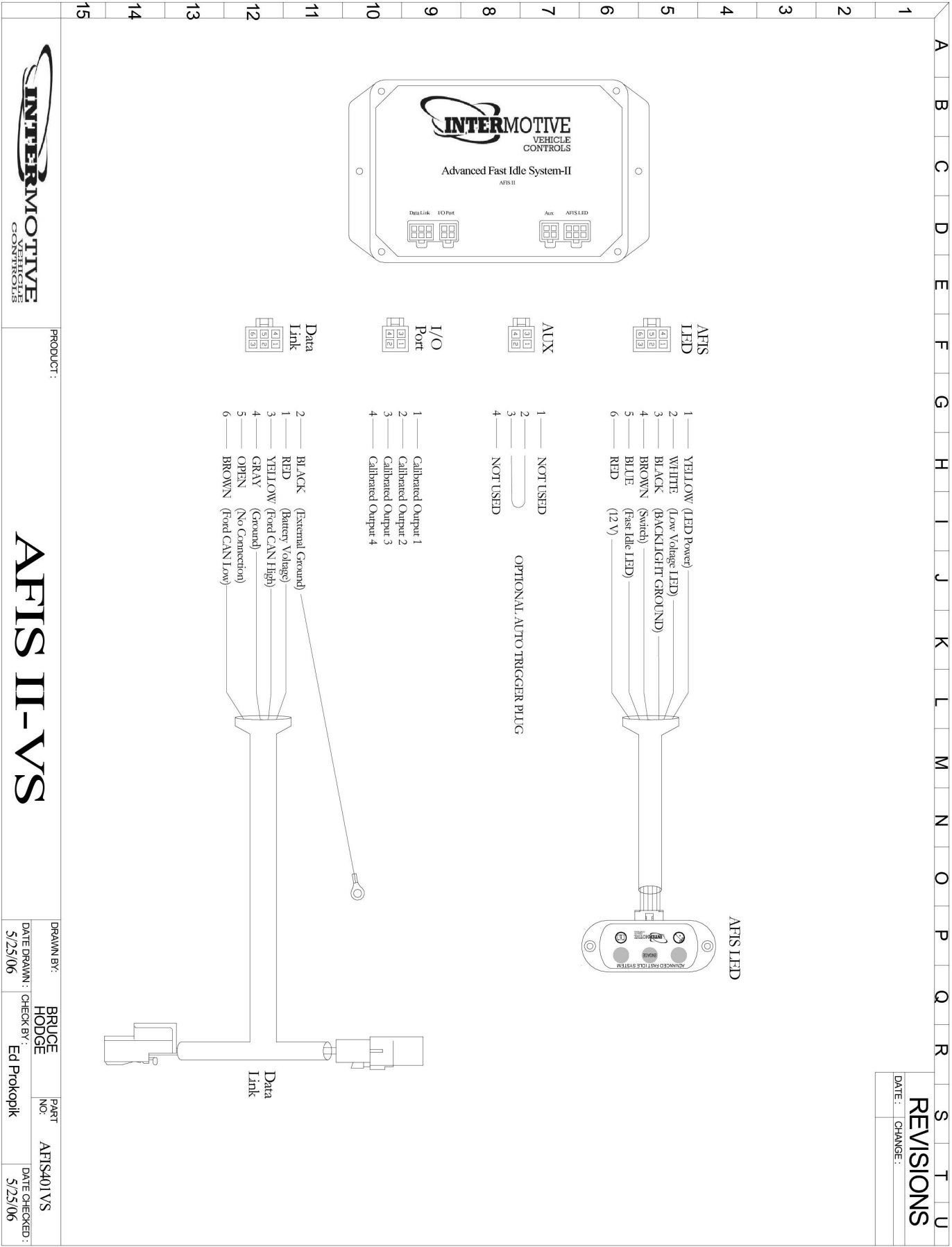
To aid in troubleshooting intermittent concerns, the AFIS II VS system stores the last five Fast Idle Stop Codes in non-volatile memory. Thus if a Fast Idle operation terminates unexpectedly, the technician can determine the cause. To initiate this feature, turn on vehicle ignition, wait until LED's proveout, and then press and hold the manual-engage switch continuously for at least five seconds. The red and green LED's will flash after 5 seconds. Release the switch and the five most recent stop codes will be read sequentially from the most recent to the oldest. A code is displayed by flashing the first digit, waiting one second, flashing the second digit, and then waiting four seconds before another code is displayed. For example if the Fast Idle Stop Code was 18, the green LED would flash one time, be turned off for one second, flash eight more times, and then remain off for four seconds. After the codes have been displayed, the LED's flash and normal operation resumes. If codes are received check all connections in the AFIS II VS system. Codes in *Italics* are functional only if the associated option is included in the AFIS II VS calibration. The Fast Idle Stop Codes are listed in Table 2.

Code	Meaning
1-2	Fast Idle Complete due to Vehicle Speed
1-4	Fast Idle Complete due to Transmission Fluid Temperature
1-6	Fast Idle Complete due to RPM
1-7	Fast Idle Complete due to Gear Position
1-8	Fast Idle Complete due to Service Brake
1-9	Fast Idle Complete due to Engine Coolant Temperature
1-10	Fast Idle Complete due to Battery Voltage > 13.0 Volts while in Charge Protection
1-11	Fast Idle Complete due to Cab A/C Commanded OFF while in Cab A/C Boost
1-13	Fast Idle Complete due to ECT > 170° For Air Temp > 70° F while in Heater Boost
1-15	<i>Fast Idle Complete due to Open or Battery voltage on I/O Pin 4 Fast Idle input</i>

Table 2: Stop Codes

If further assistance is required, contact InterMotive at (530) 823-1048. Be sure to write down any Diagnostic Trouble Codes or Fast Idle Stop Codes received so that you can provide them to the InterMotive Engineer.

REVISIONS	
DATE :	CHANGE :



PRODUCT :

AFIS II-VS

DRAWN BY: **BRUCE HODGE**

DATE DRAWN: 5/25/06

CHECK BY: **Ed Prokopik**

PART NO: **AFIS401 VS**

DATE CHECKED: 5/25/06