

# FL-AF XiED-18

Closed-Loop Fuel Management

## Inline Enrichment Device (FL-AF XiED®-18) w/AFR Display

Fits 2017 and Later Harley-Davidson® Twin Cam and Milwaukee 8

All FL with OEM 12mm Delphi 4-wire O2 sensors

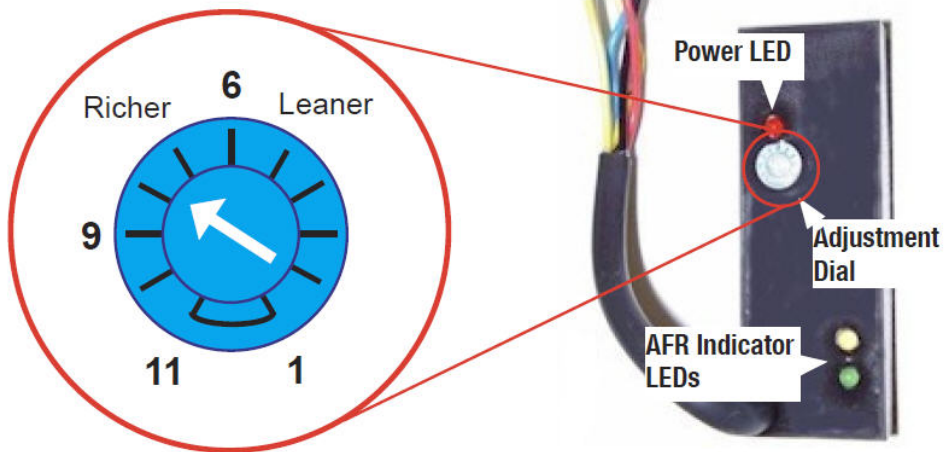
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Made in the USA

An experimental 'plug-n-play' upgrade designed to let the engine equipped with OEM oxygen sensors to externally alter ECM closed loop bias value creating a variable air fuel ratio in closed loop mode approximating richer mixtures of 14.5:1-13.6:1, depending upon exhaust temperatures. An improved air fuel mixture has generally shown one of more of the following positive results:

- Improved Throttle Response
- Less Engine Surge
- Reduced Engine Ping
- Lower Engine Temperature
- Decreased Exhaust Heat

A two LED AFR display on the XiED assists in monitoring fuel mixture by indicating 4 fuel ratio areas: Normal Lean, Normal, Normal Rich, Very Rich.



### Installation Instructions

- Locate Front/Rear O2 sensors connectors.
- Touring connectors are behind Right Side body panel below seat. Right side bag should be removed.
  - Black and White connectors.
  - Cut any tie wraps holding the connectors in place.
- Unplug HD weather-tight connectors.
- Plug the FL-AF-XIED-18 Harness between O2 sensor and wiring harness.
- Make sure the connectors lock into each other.
- Tie-wrap the control unit in place to prevent it from moving around.

### Ground Wire (BLACK) Installation all bikes

- Ground wires to chassis bolt or negative battery terminal.

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### AFR Adjustment Instructions

- The AF-XIED has an adjustable mixture control.
- Use a Jeweler's screwdriver to make adjustments to the AF-XIED.
- Do not force the variable dial adjustment.
- Set the initial value between 7 and 9. Maximum recommended setting is 9.
- Do not expose the AF-XIED to high pressure water streams.
- Making adjustments while the engine is running might cause a Check Engine light. This is not harmful. Restarting the engine should clear the CE light if it is O2 sensor related.
- If you get transient Check Engine lights, Contact Nightrider Customer Support.

### AFR LEDs Display Pattern

#### Startup

Green LED's will blink on indicating startup sequence for 5 seconds.

The AF-XIED will read the current mixture setting of the dial, providing a Yellow LED "blink" indicator from 1 to 11 blinks indicating the target AFR. Count the blinks on startup to verify the dial settings are correct.

Percent	BIAS	LAMBDA	AFR	Blink
100%	500	0.993	14.6	1
90%	556	0.986	14.5	2
80%	625	0.980	14.4	3
72%	694	0.973	14.3	4
67%	746	0.966	14.2	5
65%	769	0.959	14.1	6
<b>63%</b>	<b>794</b>	<b>0.952</b>	<b>14.0</b>	<b>7</b>
<b>62%</b>	<b>806</b>	<b>0.946</b>	<b>13.9</b>	<b>8</b>
<b>61%</b>	<b>820</b>	<b>0.939</b>	<b>13.8</b>	<b>9</b>
60%	833	0.932	13.7	10
59%	847	0.925	13.6	11

Following the mixture setting display, the AFR GREEN LED will have a fast blink indicating O2 sensor warmup. After the warm-up indicator, a random blink of the LED's will start showing the AFXIED is altering the sensor signal. This usually occurs in 2-4 minutes cold and almost immediately on a warm/hot bike.

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### Normal Running Light Patterns

- Yellow – under 400 mV from O2 sensor – Leaner than 14.8:1 AFR
- No Lights – Between 400 and 750 mV from O2 sensor – 14.7-14.2:1 AFR
- Green – over 750 mV, but less than 1100 mV – 14.2-13.8:1 AFR
- Yellow/Green – over 1100 mV – Richer than 13.2:1 AFR

Do not read too much into the light pattern of the AFR gauge. This is intended to be a general indicator of the mixture, not instant reading of the fuel mixture at any point in time. Even with some smoothing, it is not uncommon for the pattern to constantly change from blink yellow-no lights-green. This is a normal cycling of the closed loop ECM. The pattern should tend to stabilize more on “no lights” to “green” light. You will normally only see both lights on during startup or during full throttle acceleration.

Normal reversion in the HD Exhaust system is enough to create yellow light (lean spikes) in the display pattern. This is expected behavior.

The transition from yellow to ‘no color’ and back can create the illusion that the LED’s are staying solid yellow.

Please **DO NOT WATCH the AFR lights WHILE THE BIKE IS IN MOTION**

### Notes

- Richer closed loop AFR values cannot be achieved if any exhaust leaks exist. Even the smaller exhaust leak may cause less accuracy of the AF-XIED or check engine lights. Improper installation of slip on muffler or exhaust system upgrades may cause small leaks.
- AF-XIED size is 2.5”L x 0.9”W x 0.7”H.
- Settings between 14.3 (4) to 13.9 (8) tend to work best. Because of the way that the O2 sensors, AF-XIED and ECM interact, higher settings do not always result in the best results. The settings are the approximate AFR based on an average bias values in the ECM. The bias value is the “centering” voltage that the ECM uses to determine if it needs to make injector pulses longer or shorter based feedback it receives from the O2 sensor.

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Note: Transient codes P0131 and/or P0151 may be present in the electronic control module (ECM) after the XIED® is installed. The presence of these specific codes in ECM history is not an indication of a lean fuel mixture, nor does their presence cause any problems. Check Engine light may occur on some bikes from these codes due to H-D changes to the ECM. Make note of your circumstances and notify Customer Service if this occurs.

## Disclaimer:

***This product is intended for race vehicles used on closed courses, and not for use on roads or vehicles otherwise subject to emission control requirements. In California, this product must not be used on any vehicle that is registered or licensed for use on public roads.***

Actual results from the installation of the XIED® may vary between individual bikes.

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