

1- Introduction

The **GIO Instruments AFR v3.4.1 w/ BL-EXT-DBG** is an Air Fuel Ratio (AFR) controller designed for use with the Bosch LSU4.9 oxygen sensor. This device features an integrated HC-06 Bluetooth module, allowing for seamless wireless data transmission. The controller reads AFR values [Lambda (λ)] and transmits this data through GPIO pins or Bluetooth to any compatible device such as PCs or smartphones. It is reprogrammable using Arduino codes and can be powered directly from a vehicle's battery, with built-in current protection and a fuse for enhanced safety.

This product aims to provide accurate measurements of air-fuel mixtures, essential for optimizing engine performance and efficiency. It is suitable for various applications, including automotive diagnostics, furnaces, industrial heating systems, and combustion machines.

2 - Technical Details

This section provides an overview of the technical specifications and connection details of the **GIO Instruments AFR v3.4.1 w/ BL-EXT-DBG**. The module is designed for easy integration and customization, featuring multiple input and output options to cater to various user needs.

2.1- Connections

The input and output connections on the module are as follows:

2.1.1 - Power Supply

The module operates on a 12V DC power supply.

- Power Terminal 1 — +12V
- Power Terminal 2 — GND

2.1.2 - LSU4.9 Sensor

Connections for the Bosch LSU4.9 sensor:

- Terminal 1 — [+12V]
- Terminal 2 — [LSU_HEATER-]
- Terminal 3 — [LSU_VGND]
- Terminal 4 — [LSU_NERREST]
- Terminal 5 — [LSU_IA]
- Terminal 6 — [LSU_IP]

2.1.3 - HC-06 Bluetooth Module

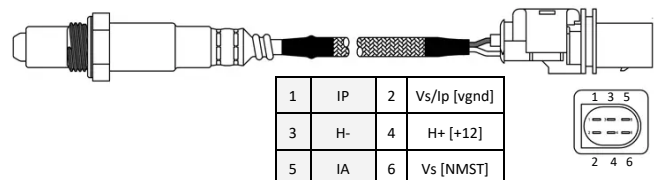
Connections for the HC-06 Bluetooth module:

- J8 Pin 1 — VCC
- J8 Pin 2 — GND
- J8 Pin 3 — BL_RX
- J8 Pin 4 — BL_TX



LSU 4.9 Sensor

Power Terminal



2.1.4 - GPIO & DEBUG

Analog IO pins of Atmega328:

- J5 a1 — Atmega328 pin25 [PC2 Analog Input/Output 5]
- J5 a2 — Atmega328 pin27 [PC4 Analog Input/Output 4]
- J5 a3 — Atmega328 pin28 [PC5 Analog Input/Output 5]

Digital IO pins of Atmega328:

- J4 d1 — Atmega328 pin11 [PD5 Digital Input/Output 5]
- J4 d2 — Atmega328 pin12 [PD6 Digital Input/Output 6]
- J4 d3 — Atmega328 pin13 [PD7 Digital Input/Output 7]

RX and TX pins of Atmega328:

- J10 rx — Atmega328 pin2 [PD0 Digital Input/Output 0]
- J10 tx — Atmega328 pin3 [PD1 Digital Input/Output 1]

Power output:

- J3 PIN+ — +5V power output
- J3 PIN- — GNDpower output

2.2 - Technical Specifications

The **GIO Instruments AFR v3.4.1 w/ BL-EXT-DBG** is integrated with an HC-06 Bluetooth module and capable of transmitting data from the Bosch LSU4.9 sensor through GPIO pins or Bluetooth. It is reprogrammable using Arduino codes and powered directly from a vehicle's battery. The module includes current protection and a fuse for safety. Key technical specifications include:

- **Power Supply:** 12V DC
- **Sensor Compatibility:** Bosch LSU4.9
- **Bluetooth Module:** HC-06
- **Microcontroller:** ATMEGA328
- **Protection:** Built-in current protection and fuse
- **Programming:** Reprogrammable with Arduino codes
- **Output:** Digital output via GPIO pins and Bluetooth

2.3 - Firmware

Arduino codes for ATMEGA328: [Please contact]



2.4 - Software

MIT App Inventor basic application template for Android devices: [Please contact]



3 - Contact

For more information or support, please contact:

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