



Thanks for purchasing our X-2 meter. Before operating this unit, please read carefully these instruction sheets and retain them for future reference.

⚠ Precautions

- 1- This meter has been designed to work on 12 volts DC applications only. Make sure the power do not exceed 18 volts DC otherwise this might damage the instrument.
- 2- For proper installation, please follow the steps describes in these instruction sheets. Any damages caused by wrong installation shall be imputed to the users.
- 3- Do not disassemble or change any parts.
- 4- To avoid short circuit, do not pull the wires out of the terminals.
- 5- The interior examination or maintenance should be executed by our professionals only. Opening the instrument will void the warranty.
- 6- While riding the vehicle, do not attend to change the settings of the instrument to avoid injuries to yourself or others.

NOTE Some procedures must be followed to avoid damage to the instrument.

⚠ WARNING Some procedures must be followed to avoid injuries to yourself and others.

⚠ CAUTION! Some procedures must be followed to avoid damages to the vehicle

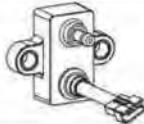
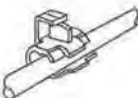


Press once



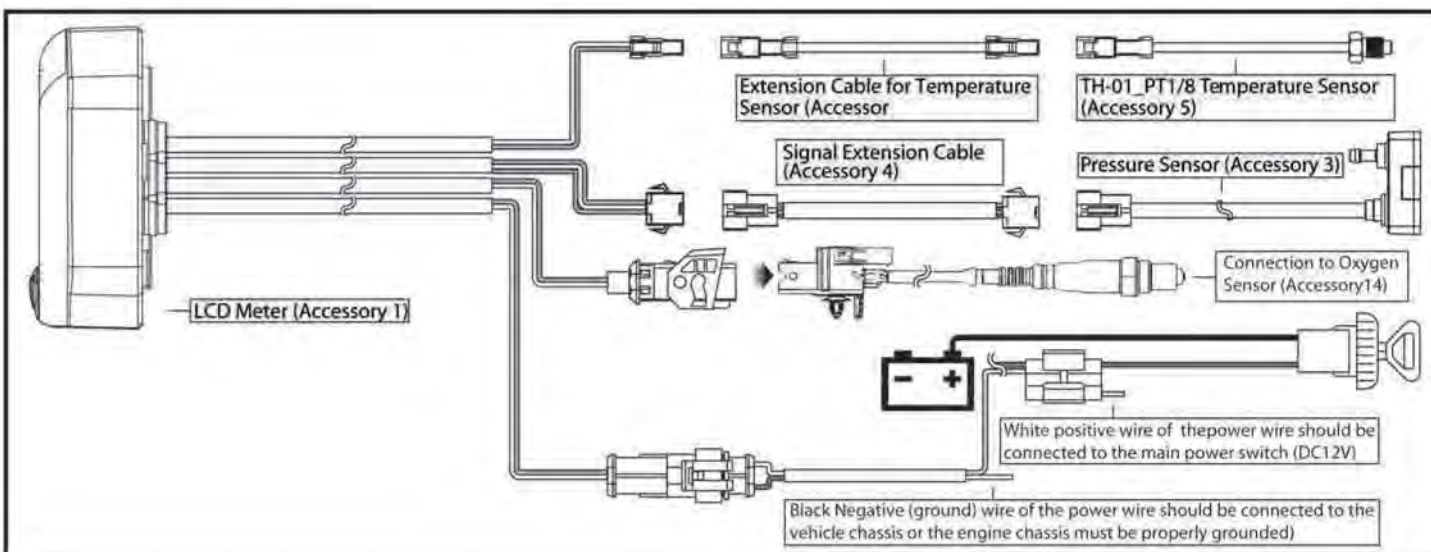
Press three times

1-1 Accessories

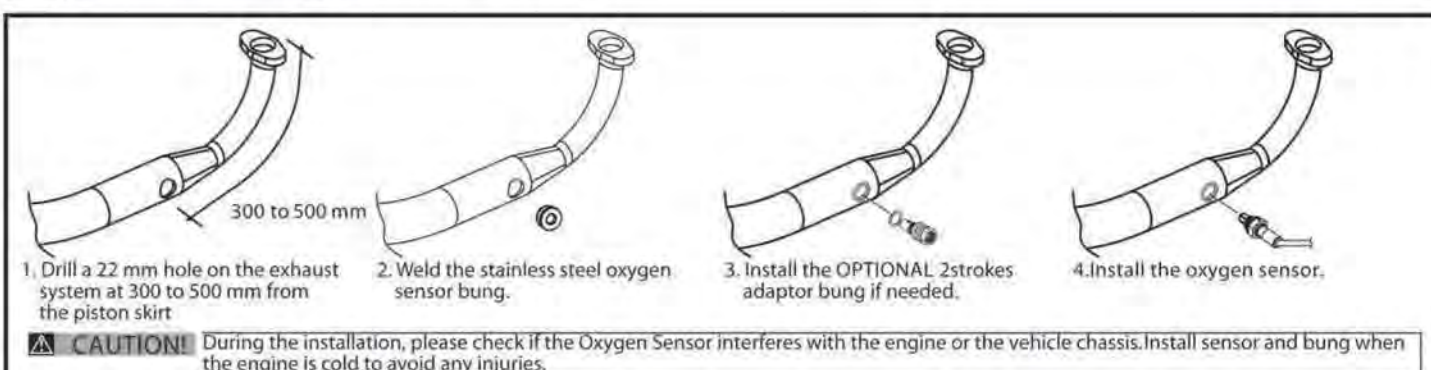
1 Meter X1 	2 Power wire X1 	3 Pressure Sensor X1 	4 Signal Extension Cable X1 
5 1/8 NPT Temperature Sensor X1 	6 Extension Cable for Temperature Sensor X1 	7 Hose X1 	8 Hose Clamps X2 
9 M6 x P1.0 Hex Screws X2 	10 Dashboard Mounting Bracket (x1) 	11 M5 x 18L Hex Screws X2 	12 M5 Washers X2 
13 Jumper Terminals X2 	14 Boost O ² Sensor X1 		

NOTE Contact your local distributor if the items listed above are not the same as the one received.

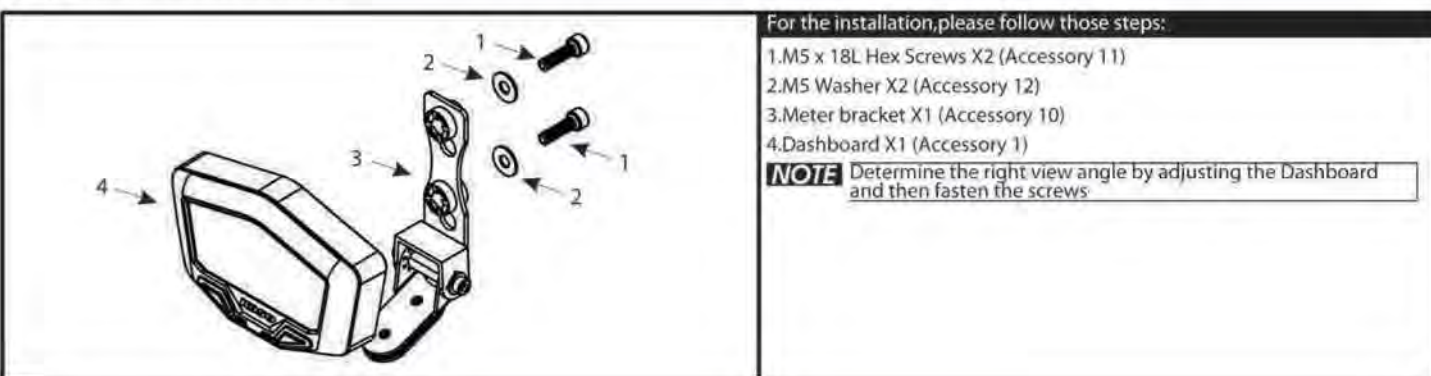
2-1 Wiring Installation



2-2 Installation of Oxygen sensor and bung.



2-2 Bracket Installation



3-1 Screen Functions

Warning Indicator for low AFR (LEAN)
Setting Range: 14.7 ~ 24.0
Setting Unit: 0.1

The setting value for the AFR indicator is 14.7 as the standard value. When the setting value is lower or higher than the standard value, the LEAN or RICH warning indicators will turn on.

Warning Indicator for high AFR (RICH)
Setting Range: 9.0 ~ 14.7
Setting Unit: 0.1

Temperature Meter
Display Range: 0.0 ~ 250.0 °C
(32.0 ~ 482.0 °F)
Display Unit: 0.1 °C (°F)



Warning Indicator for Over-temperature
Setting Range: 60.0 ~ 250.0 °C (140.0 ~ 482.0 °F)
Setting Unit: 1 °C (°F)

Warning Indicator for Pressure
Positive Pressure Setting Range: 1.0 ~ 30.0 PSI
Negative Pressure Setting Range: -1.0 ~ -30.0 PSI
Setting Unit: 1 PSI

Level Display for AFR
Display Range: 9 ~ 21
Display Unit: 0.2
Level Display for Pressure (15 psi)
Display Range: ± 0 ~ 15 PSI
Display Unit: 0.5 PSI
Level Display for Pressure (30 PSI)
Display Range: ± 0 ~ 30 PSI
Display Unit: 1 PSI

Digital Display for AFR
Display Range: 9 ~ 24
Display Unit: 0.1

Digital Display for Pressure
Display Range: ± 0.0 ~ 30.0 PSI
Display Unit: 0.5 PSI

3-2 Functions and Settings

AFR Meter	Display Range: 9.0~24.0, flashes when the current value exceed the set value. Display Unit: 0.1	
AFR Level Display	Display Range: 9~21 Display Unit: 0.2	
AFR Warning Indicator	Setting Range for RICH: 9.0~14.7 (when the AFR value is lower than this setting, the RICH Warning Indicator will turn ON.) Setting Range for LEAN (when the AFR value is higher than this setting, the LEAN Warning Indicator will turn ON.) Setting Unit: 0.1	
Pressur Meter	Display Range: ±0.0~30.0 PSI flashes when the current value exceed the set value. Display Unit: 0.5 PSI	
Pressure Level Display	Display Range: ±0~15PSI Display Range: ±0~30PSI	Display Unit: 0.5 PSI Display Unit: 1 PSI
Pressure Warning Indicator	Positive Pressure Setting Range: 1.0 ~ 30.0 (when the pressure is higher than the positive pressure setting, the warning indicator will turn ON.) Negative Pressure Setting Range: -1.0 ~ -30.0 (when the pressure is lower than the negative pressure setting the warning indicator will turn ON.) Setting Unit: 1 PSI	

Thermometer	Display Unit: °C / °F Switchable	
Temperature Gauge	Display Range: 0.0~250 °C (32.0~482.0 °F) Flashes when the current value exceed the set value Display Unit: 0.1 °C (°F)	
Temperature Warning Light	Setting Range: 60.0~250.0 °C (140.0~482.0 °F) Flashes when the current value exceed the set value Display Unit: 0.1 °C (°F)	
Backlight voltage	DC 12V	
Temperature range of body	-10~+60 °C	
Body specifications	JIS D 0203 S2	
Dimensions	100 X 60 X 20 mm	
Weight	Approx 200g	
Indicators	☐ AFR (Green) ☐ Pressure (Red) ☐ High AFR (Red) ☐ Temperature (Red) ☐ Low AFR (Red)	

NOTE Design and specifications are subject to change without notice.

4-1 Adjust Button Operation



In the AFR screen, press the Adjust button to enter the Pressure screen.

NOTE When the display is in the Pressure screen, press the Adjust button to enter the AFR screen.

In the Pressure screen, press the Adjust button to enter the AFR screen. Press and hold the Adjust button for 3 seconds to enter the Pressure Level Range screen.



AFR Screen

4-2 Select Button Operation



In the AFR screen, press the Select button to enter the peak AFR (LEAN) record screen. In the startup screen, press and hold the Select button for 3 seconds to switch between the temperature units.



In the peak AFR (LEAN) screen, press the Select button to enter the peak AFR (RICH) record screen.

CAUTION! In the peak record screen, the temperature indicator may display the current peak record.

In the peak AFR (RICH) screen, press the Select button to return to the startup screen.

Startup screen



In the Pressure screen, press the Select button to enter the peak positive pressure record screen.

In the peak positive pressure screen, press the Select button to enter the peak negative pressure record screen.

In the peak negative pressure record screen, press the Select button to return to the Startup screen.

Startup screen

4-3 Adjust + Select Buttons Operation



In the Startup screen, press and hold the Adjust + Select buttons at the same time for 3 seconds to enter the setting screen (please refer to Section 5-1 Settings)

Press the Adjust button to select the function screen that need to be configured



Startup screen

Temperature Setting Screen

AFR Setting Screen

Pressure Setting Screen

5-1 Function Settings



In the Startup screen, press and hold the Adjust+Select buttons at the same time for 3 seconds to enter the Setting Screen.



Press the Select button to enter the Over-temperature Warning Setting



Example: set the over-temperature warning at 68 °C
Press the Adjust button to adjust the setting value



⚠ Press the Select button to move the cursor to the level to be configured.

NOTE Temperature Setting Range: 60~250°C (140~482°F)



Example: The over-temperature setting value is now configured from 60 °C to 68 °C. Press the Select button to return to the temperature setting screen.

Press the Adjust button to enter the AFR Warning setting screen



Press the Select button to enter the AFR RICH warning setting.



Example: to configure the AFR RICH Warning setting at 13.
Press the Adjust button to set the needed value.



⚠ Press the Select button to move the cursor to the level to be changed.

NOTE AFR RICH Setting Range: 9.0 to 14.0



Example: to configure the AFR RICH Warning setting from 10 to 13
Press the Select button to enter the AFR LEAN Warning setting screen.



Example: to configure the AFR LEAN Warning setting at 18.7.
Press the Adjust button to set the value to be changed



⚠ Press the Select button to move the cursor to the level to be configured.

NOTE AFR LEAN Setting Range: 14.7 to 24



Example: to configure the AFR RICH Warning setting from 14.7 to 18.7.
Press the Select button to return to the AFR Warning setting screen.



Press the Adjust button to enter the Pressure Warning setting screen.



Press the Select button to enter the Negative Pressure Warning Setting screen.



Example: to configure the Pressure Negative Pressure Warning setting at 10.
Press the Adjust button to set the needed value.



⚠ Press the Select button to move the cursor to the level to be configured.

NOTE Negative Pressure Setting Range: -1.0 to -30.0



Example: to configure the Negative Pressure Setting from -30 to -10.
Press the Select button to return to the Positive Pressure Warning Setting screen.



Example: to configure the Positive Pressure Warning setting at 15.
Press the Adjust button to set the needed value to be configured.



⚠ Press the Select button to move the cursor to the level to be configured.

NOTE Positive Pressure Setting Range: 1.0 to 30.0



Example: to configure the Positive Pressure Warning setting from 10 to 15.
Press the Select button to return to the Pressure Warning Setting screen.



Press the Adjust button to return to the Startup screen.



Startup screen.

6 Troubleshooting

If you encounter operational failure, please check the following steps. If the problem still occur, please contact your KOSO dealer.

Problem	Cause
The Dashboard has nothing displayed.	The power wire is not properly connected.
The AFR value is not displayed.	The Signal wire for the Oxygen Sensor is not properly connected. Please check if the Signal Wire for the Oxygen Sensor is properly connected.

Problem	Cause
The Temperature is not displayed.	The Signal wire for the Temperature Sensor is not properly connected. Please check if the Signal wire for the Temperature Sensor is properly connected.
The Pressure is not displayed.	The signal cable for the pressure Sensor is not properly connected. Please check if the Signal wire for the pressure Sensor is properly connected.

Warning

This Wide Band air/fuel gauge must be installed by a certified mechanic. Koso North America is not responsible for any damages that might be caused to the vehicle or its users.

- Do not cut or modify the sensor or wiring harness.
- Do not connect or disconnect the sensor when the instrument is working.
- Do not apply voltage above 18 volts DC.
- Do not open or modify the instrument or sensor.
- This instrument should be used as a tuning tool or race instrument.
- Connect the instrument only on DC power.
- Due to the nature of its use, the BOSCH LSU4.2 sensor is not covered by any warranty.
- Koso air/fuel ratio instrument is covered for any manufacturing defect for a period of 6 months following the date of purchase.

Facts about Air/fuel ratio

The first role of an oxygen sensor is to communicate to the ECU or the gauge if the engine is running lean or rich. The goal is to have the motor run at 14.7 parts of air for 1 part of fuel (Lambda 1). Having the engine running at 14.7 to 1 would represent the optimal exhaust combustion.

Oxygen sensor facts

The Koso Wide Band air/fuel ratio meter is currently using the BOSCH LSU4.2 sensor. The 5 wires Wide Band oxygen sensor is the most accurate sensor on market. This sensor is able to read between 10.0 to 24.0 to 1. The operating temperature of the sensor should not exceed 1700 degree F. Using the sensor with leaded fuel or on 2 strokes engine will shorten the life of the sensor. Using a sensor bung adaptor will help extend the life of the sensor.

Calibration of the instrument

Each BOSCH LSU 4.2 oxygen sensor is individually laser trimmed with its own value for better results. The LSU 4.2 sensor is using a unique "breather" system located on the connector (figure 1) to calibrate himself. This means the sensor is self-calibrating with the ambient air so there is no need to calibrate the sensor. This process replaces the "free air" calibration procedure when changing the sensor or using the unit on another exhaust system was needed. It would be very important not to block the cap above the breather (figure 2) due to the fact that the sensor is self-calibrating by "breathing" air from this hole.

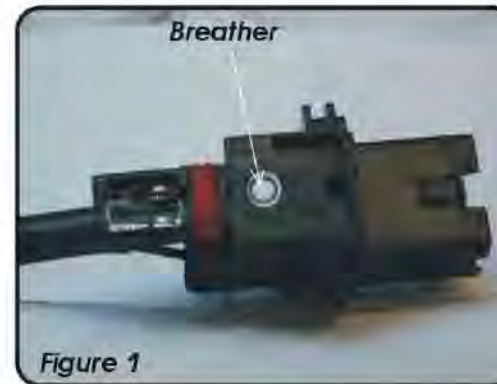


Figure 1



Figure 2

Oxygen sensor installation

According to the oxygen sensor manufacturer, for better results, the sensor should be installed at the warmest location on the exhaust system. This would usually represent the first part of the exhaust which would be 300 to 500 millimeters from the piston skirt (figure 3). On a 2 strokes engine, it is strongly recommended to use a sensor bung adaptor to lower the impact of oil contamination (figure 4) on the O2 sensor. The sensor should be assembled with high temperature non permanent grease and tighten at 40-60 Nm. The use of cleaning fluids at the sensor plug is not permitted. Avoid any water or condensation on the tip of the sensor otherwise it might damage the internal components. Sensor must be installed with an angle of at least 10 degree (figure 5). Thus preventing the collection of liquids between sensor housing and sensor element during the cold start phase.



Figure 4



Figure 3

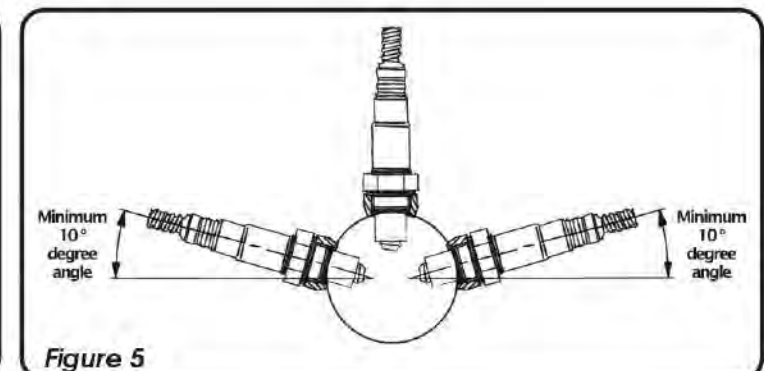


Figure 5