



ISAAC 38 ECU System Instruction Manual

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ISAAC 38 ECU System



Preface

- Congratulations on your purchase of the ISAAC Air Management system to control the aftermarket air suspension of your vehicle.
- Your new system boasts the latest ride height leveling technology that recognizes changes in the stance of the vehicle and adjusts all 4 airbags to accommodate for the change. Whether you are driving or parked, the ISAAC will automatically maintain your preferred ride height. The system can also be controlled by pressure sensors that tie directly into the onboard ECU or the drive can, if they choose, make adjustments manually from the handheld controller included with the system.
- The system is pre-programmed with 4 uniquely different presets to make it very easy to adjust as soon as you install your system.

1. High mode

- ~90% of suspension stroke
- Increased mobility and obstacle avoidance.

2. Driving mode

- ~50% of suspension stroke
- Regular driving vehicle height

3. Low mode

- ~20% of suspension stroke
- Softer ride; lower stance

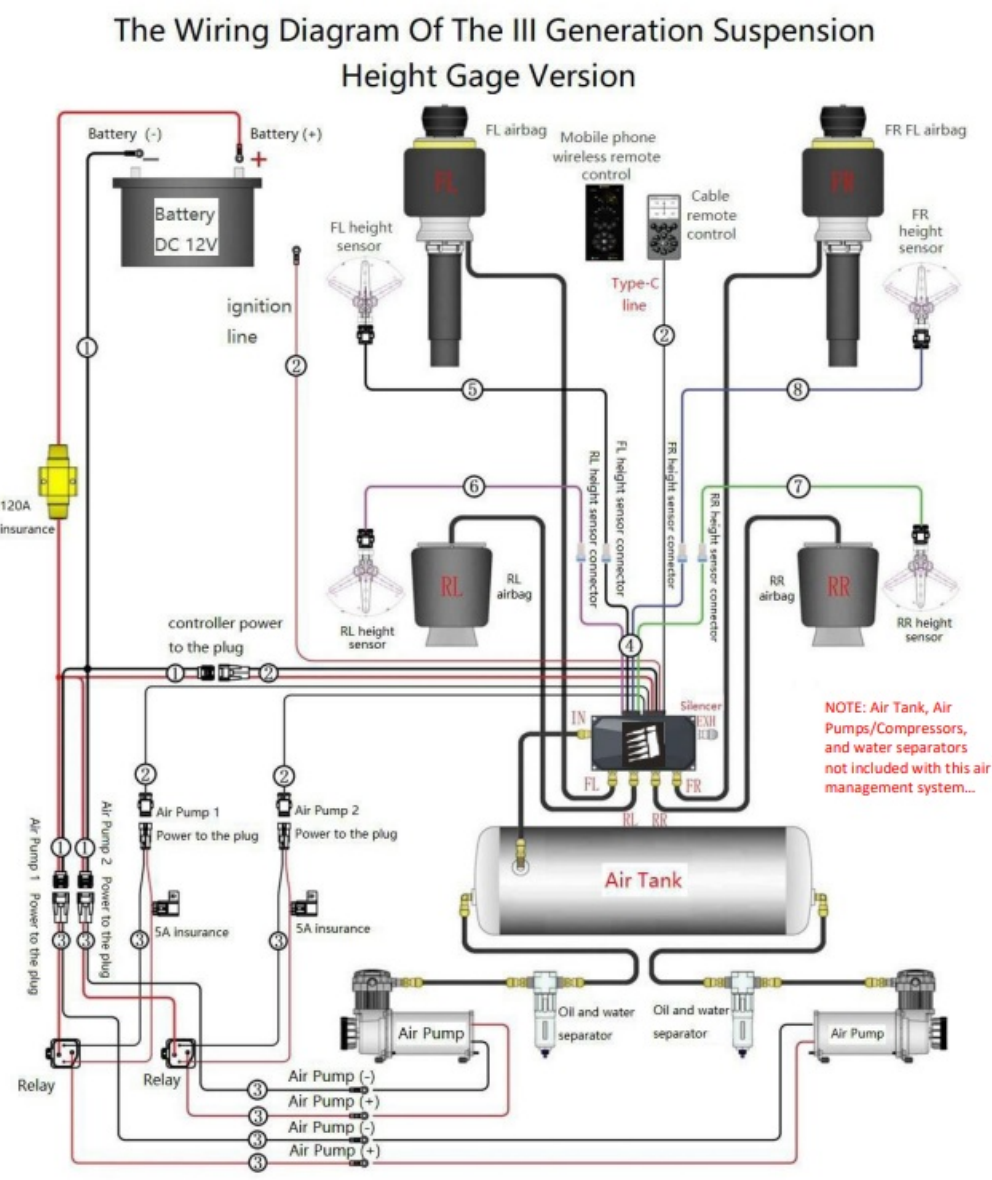
4. Low down mode

- ~0% of suspension stroke (all 4 airbags deflated)
- Lowest stance; Only recommended to display a parked vehicle.

- Get ready because you are about to experience a whole new driving experience with your new ISAAC at the helm. Enjoy!

- **Note:** This system is intended to electronically manage airflow in conjunction with a complete aftermarket air suspension system.
- Additional components of the complete suspension system will need to be purchased to suit your specific vehicle and preferences.

System structure arrangement



Number	Wiring harness	Number	Wiring harness
1	The main power supply wire	5	FL height gage wire
2	ECU control wiring harness	6	RL height gage wire
3	The pump beam	7	RR height gage wire
4	Height gage wire	8	FR height gage wire

Installation instructions

- When you have completed of the air suspension system (Bag Brackets, Airbags and/or air struts, air line, air

tank, and air compressor), you can then start installing your new ISAAC Air Management system.

- System structure layout
- Description of system structure
- The system consists of an electromagnetic valve manifold housed with pressure control sensors and an electric control unit (ECU), a handheld remote control, electronic height sensors, and a collection of wire harnesses and hardware to connect the system to the vehicle and the air supply.
- **Attention:** Be sure to keep wires and wire harnesses away from heat sources in the vehicle. The wire harnesses are sheathed to withstand being run through most tight spaces in the vehicle, however, we recommend added protection in areas where the wiring is being run through the holes in steel where there may be sharp edges.
- The Valve Manifold should be installed near the air compressors and air tank for best results. A common location would be either the trunk of a car or behind the seat in a pickup truck.
- **Warning:** Before installing the wiring, be sure to disconnect the vehicle battery ground wire.

Wiring Harness

1. Disconnecting the Battery Ground Wire

- First, disconnect the ground wire from the vehicle's battery.

2. Routing the Wire Harness

1. Refer to the system structure map on page 3. Lay out the wire harnesses approximately where they will be installed.

3. Connecting Components: Electric Pump, Solenoid Valve Group, Relay

1. Follow the system structure layout and wiring harness instructions on the label. Connect each harness connector to the corresponding parts. Ensure they are securely seated with a "click." For ECU connectors, engage the overhand card buckle lock.
2. Use bolts or self-tapping screws to secure the electric pump, solenoid valve, relay, and other components in their designated locations.
3. Extend the wire harness carefully to ensure stable and reliable connections. Insulate any bare metal parts effectively.

4. Cable Remote Control Installation

1. Choose a convenient location for the cable remote control that allows easy operation by the driver.
2. Refer to the label instructions and connect the wiring harness connectors, ensuring they are securely locked with the docking card buckle.

5. Grounding

1. Connect the public ground wire to a bare metal part of the vehicle frame or chassis (ensure any rust or paint is fully removed for a good connection).

6. Battery and Ignition Connections

1. According to the wiring harness label instructions, connect one end of the power cord to the battery positive terminal. Connect the other end to the relay pins using bolts.
2. Locate the vehicle's ignition signal (available only when the engine is running), and connect it to the ignition line. Ensure any exposed metal parts are effectively insulated.

Attention:

1. Ensure each wiring harness plug is inserted in the correct orientation; do not force connectors that do not match.
2. Confirm each connector is firmly seated; you should hear a distinct “click” when they lock into place.
3. Keep the wiring harness away from exhaust pipes or other high-temperature areas.
4. Use rubber grommets in metal parts to prevent sharp edges from damaging the wire harness.

Height sensor installation

Terminology:

- **Swing Arm:** A component linking the wheel to the vehicle body, ensuring the wheel follows a specific track movement. Also known as the control arm.
- **Vertical Displacement:** The vertical distance observed during the rotational movement of the swing arm.

Determining the Height Sensor Position:

- The position of the height sensor plays a crucial role in the effective operation of your suspension system.

Follow these guidelines to ensure optimal placement:

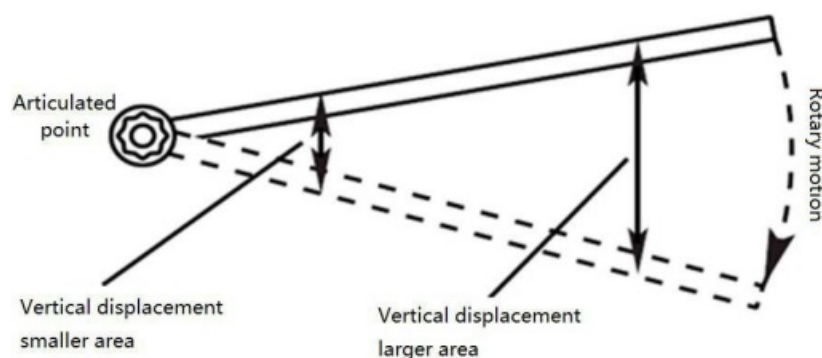
- **Understanding Vertical Displacement:** As the vehicle moves up and down, the swing arm rotates around its articulation point.

The amount of vertical displacement varies across the swing arm's range:

- **Near the articulation point:** Minimal vertical displacement.
- **Away from the articulation point:** Increased vertical displacement.

Installation Considerations:

- Avoid installing the sensor in areas with minimal vertical displacement. This can limit the sensor's effective range and reduce suspension control accuracy.
- Similarly, avoid areas with excessive vertical displacement as this can potentially damage the sensor due to over-travel.



Recommended Installation Range:

- Refer to the diagram below for the recommended installation range. Place the sensor where it can effectively measure the vehicle's vertical movement without exceeding its operational limits.

Understanding Swing Arm Movement:

- The level sensor should be positioned where the swing arm can articulate freely. This allows the sensor to accurately measure changes in vehicle height.
- Avoid installing the sensor where the swing arm's movement is too restricted, as this can limit its effectiveness.

Optimal Positioning:

- Locate the position on the swing arm where it can achieve the maximum allowable swing angle, as specified by the positioning card.
- Ensure the sensor is placed within this range to capture the full range of suspension movement.



Attention:

- Observe the wheel's movement during installation to ensure the sensor accurately detects changes.
- Use a lifting machine to elevate the vehicle safely and prevent shaking during sensor installation.
- **Important:** Do not operate when the vehicle is parked on the ground or on a jack.
- Before installing the height sensor, carefully check for any potential interference with vehicle components such as the steering wheel, tires, drag link, and stabilizer bar.
- Perform interference tests with the wheels turned to their maximum and minimum positions.

Height sensor installation steps:

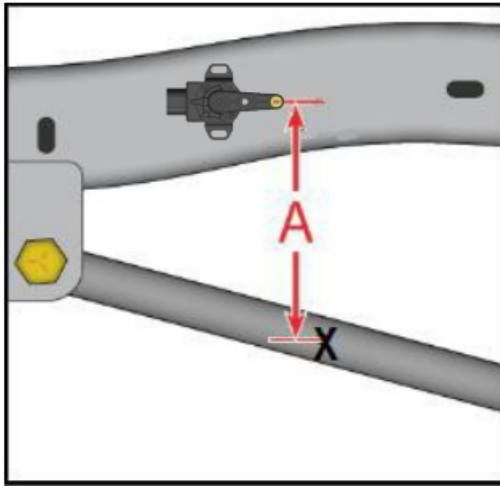
1. Installation of the Height Sensor

1. Locate Suitable Installation Points:

- Find a suitable point on the body girder where you will install the height sensor.
- Below this point vertically, mark an “X” on the suspension swing arm at a corresponding position.

2. Positioning the Height Sensor:

- When the suspension swing arm is at its lowest position, ensure the height sensor's swinging rod is also at its lowest point.



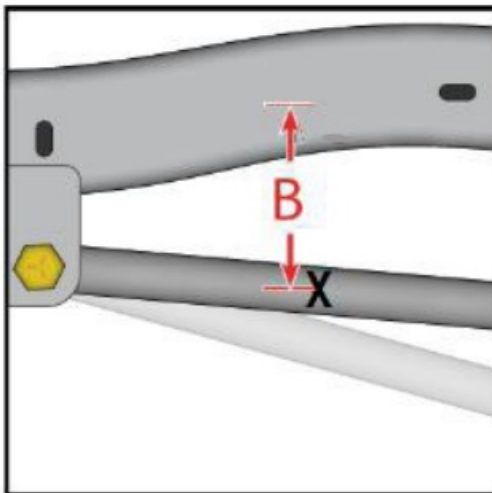
2. Checking Altitude Sensor Pendulum Arm Position

1. Swing Arm Movement:

- Move the suspension pendulum arm to its highest position.

2. Verify Alignment:

- Check if the altitude sensor pendulum arm remains within the scope defined by the positioning card.
- Ensure the sensor's swinging rod maintains proper alignment and does not exceed the designated range on the positioning card.



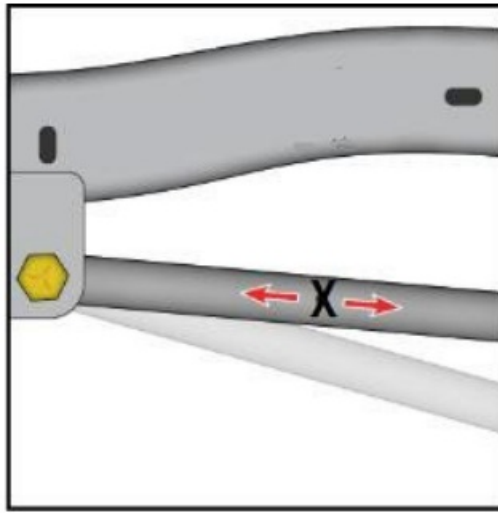
3. Adjusting the Height Sensor Position

1. Exceeding Positioning Card Limits:

- If the sensor swinging rod exceeds the positioning card's angle limits, adjust towards the “X” mark closer to the articulated point.
- Repeat steps 1 to 2 for proper alignment.

2. Minimal Angle Variation:

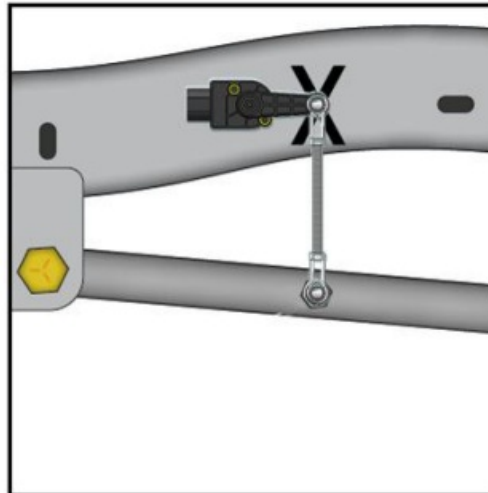
- If the sensor swinging rod shows minimal angle variation within the positioning card's range, adjust the marked points further from the hinged point.
- Repeat steps 1 to 2 to ensure accurate sensor



4. Checking Threaded Rod Position

1. During Intermediate Suspension Travel:

- At the vehicle's intermediate suspension position, observe the threaded rod connected to the sensor on the swinging rod.
- Determine if adjustments are needed to avoid overextension of the lever.



5. Attaching the Sensor Bracket to the Frame

1. Using Self-Tapping Screws:

- Secure the sensor bracket to the frame using self-tapping screws.
- Alternatively, mark and punch holes, then use fixed pull rivet nuts for attachment.

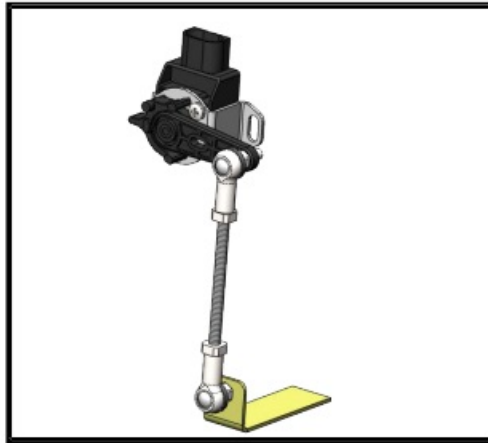
6. Installing the Bracket

1. Determining the "X" Position:

- Follow steps 3 and 4 to determine the exact position marked as "X".

2. Bracket Installation:

- Use the existing holes in the arm or consider creating new ones if necessary.
- Avoid unnecessary punching or welding.



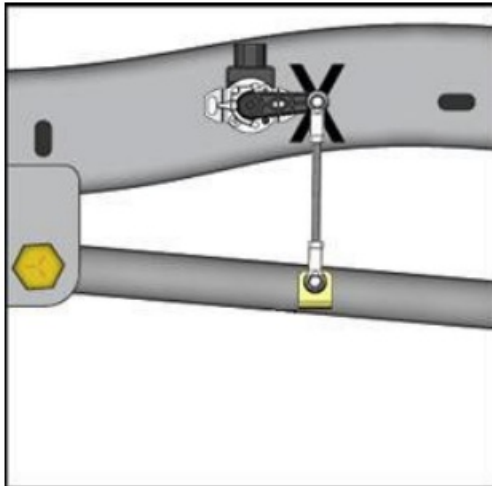
7. Adjusting the Vertical Rod Length

1. Positioning the Sensor Bracket:

- Install the sensor bracket at the intermediate position of the vehicle's suspension travel.

2. Setting the Vertical Rod Length:

- Align the sensor beam vertically or horizontally with the vehicle's body.
- As the suspension arm reaches its highest and lowest points, fine-tune the vertical rod length.
- Ensure the sensor swinging rod maintains the same angle horizontally throughout.



Completing Height Sensor Installation

1. Final Tightening:

- Ensure all bolts and nuts are securely tightened to complete the altitude sensor installation.

2. Testing Front Height Sensor:

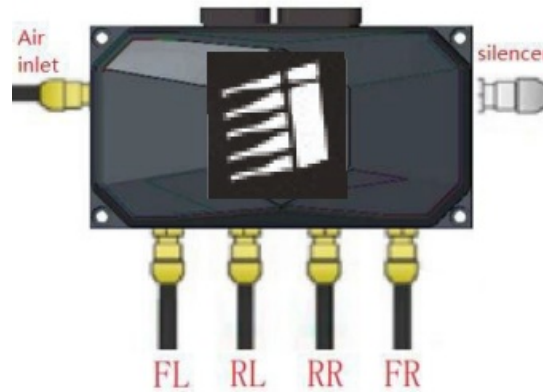
- If installing the front height sensor, perform a turning test.
- Turn the wheels fully left and then fully right to check for any interference.
- Conduct this test separately at both the highest and lowest suspension positions.

Air line

1. Connecting the Valve Manifold

- **Front Left (FL) Valve:** Connect to the front left airbag.
- **Rear Left (RL) Valve:** Connect to the rear left airbag.
- **Rear Right (RR) Valve:** Connect to the rear right airbag.
- **Front Right (FR) Valve:** Connect to the front right airbag.

- **IN Mouth Valve Group:** Connect to the air inlet.
- **EXH Mouth Valve Group:** Connect to the outlet.



2. Connecting the Air Compressors and Air Tank to the Valve Manifold

1. Connect the Components:

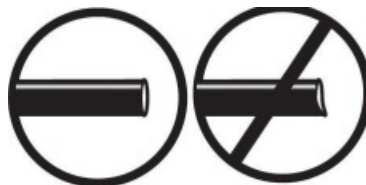
- Follow the system structure arrangement to connect the electric compressors (pumps) and air tank, to the valve manifold using hoses.

2. Air Filter Installation:

- It is recommended to install an air filter.
- In cold climate environments, ensure the air filter is equipped to maintain stable operation of the air system.

Attention:

1. Use the standard pipe cutter or blade, ensure the airline end is round and smooth.
2. Keep the airline away from sharp edges and sources of heat source. If necessary, use insulating casing.



Installation testing

Once the wiring harness, body connections, gas path, and height gauge are all connected, proceed to conduct the system test.

Note: Testing should be done with the vehicle up on a lift or jacks.

System Test:

1. Starting and Pressurizing the System:

- Start the vehicle. The air compressors will activate and begin pressurizing the air tank
- The compressors will automatically shut down upon reaching the maximum set pressure. If the tank volume is 5 gallons, both compressors will operate, taking approximately 2 to 3 minutes for the process.

2. Checking Wheel Position Adjustment:

- Using the cable remote control buttons as indicated, verify if the corresponding wheels rise. During the rise, the vehicle body consumes air, prompting the air compressor to start automatically as needed.

3. Inspection on Lift (or jacks):

- Place the vehicle on a lift to conduct a thorough inspection of the mechanical system.

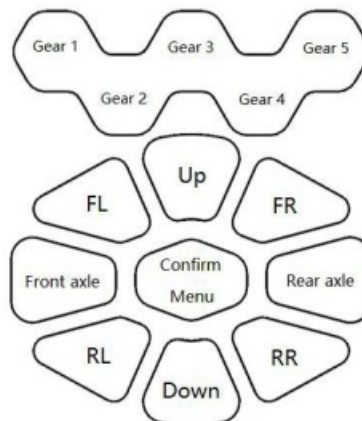
- Check for air leaks throughout the entire range of travel and inspect surrounding parts.

4. Safety Procedure for Flat Repairs:

- When repairing leaks, first elevate the vehicle.
- Turn off the ignition and release the air from the air tank before beginning any repair work.



Key areas as shown below:

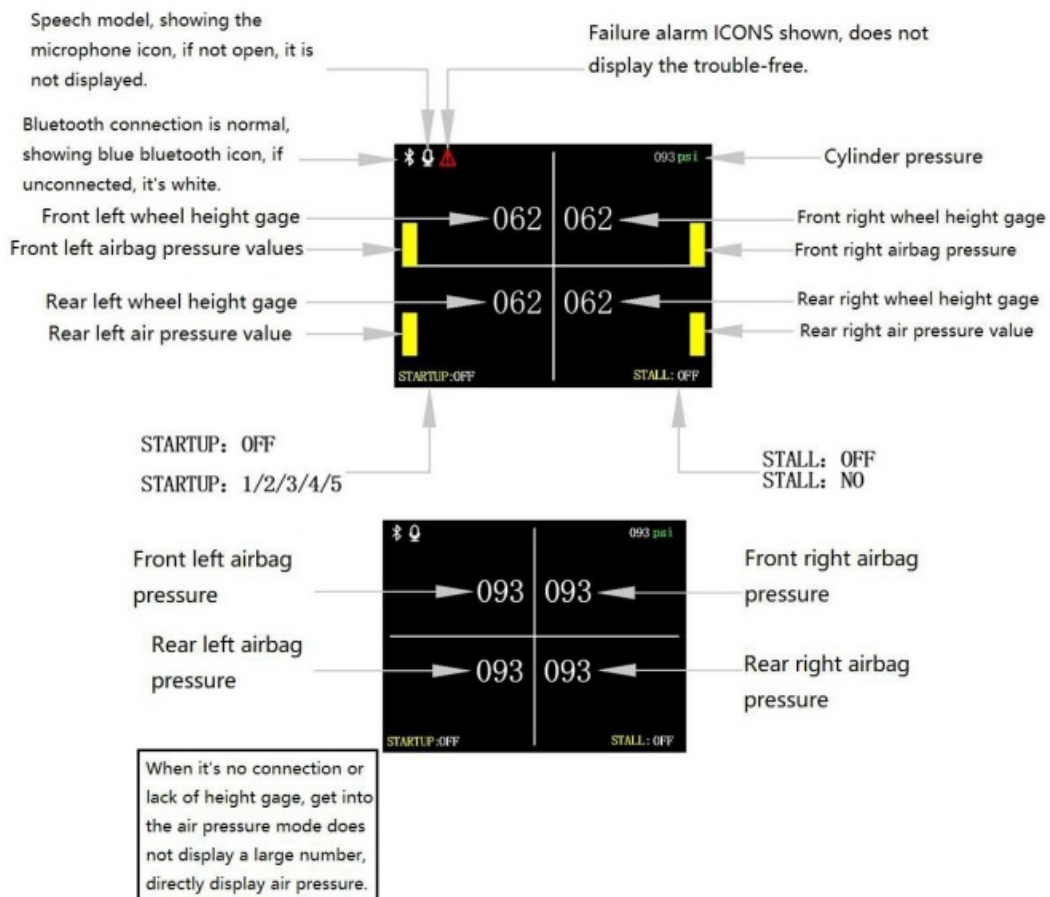


The remote-control display function

Button functions contrast



Interface functions contrast



The use of remote control

1. Basic operation



1. Unilateral adjustment

1. Press the button of position indicated to adjust (FL, FR, RL, RR, respectively means front left, front right, rear left and rear right).
2. Use the up and down keys to adjust to the required height.

2. Adjustment of front and rear axle

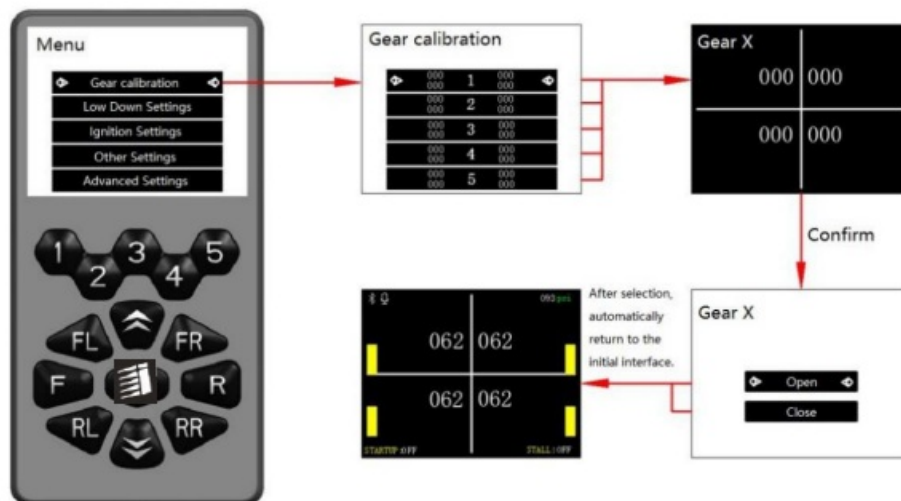
1. Press the button of the axle you want to adjust (F, R, respectively means front axle, rear axle)
2. Use the up and down keys to adjust to the required height.

3. Adjust at the same time

1. Long press on the up key will move all corners up at the same time, long press down key will move all corners down at the same time.
2. Adjust to the required height.

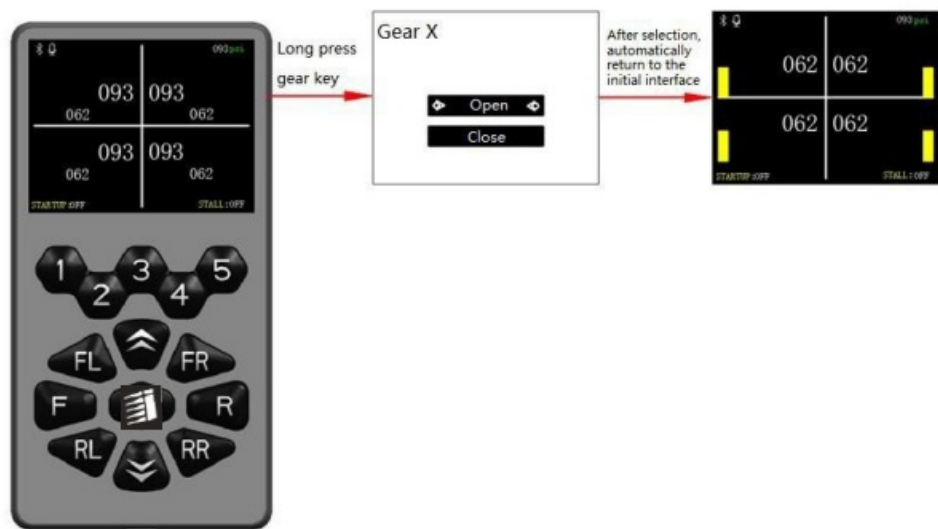
2. Gear (Pre-set) calibration

- Set the gear calibration (aka. Pre-sets)



- Method one:

1. Long press of the confirm (logo) button to enter the menu interface, select gear calibration.
2. Choose the required gear adjustment (Pre-set #).
3. Adjust the settings. After the adjustment, press the confirm (logo) button.
4. Select open to save Settings, select close to do not save.



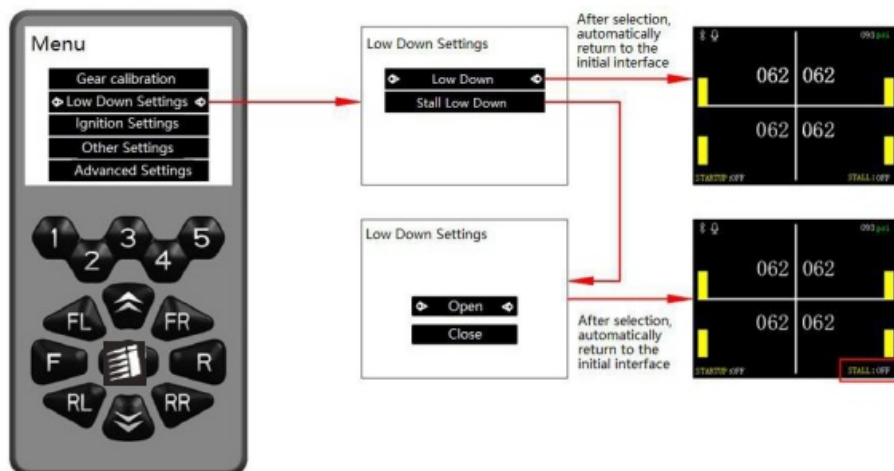
• Method two:

1. Directly adjust in the initial interface.
2. After the adjustment, long press the gear (pre-set) button that you want to program.
3. Select open to save Settings, select close to do not save.

Use the gear (pre-sets)

In the initial interface, press the gear which is needed to use.

Low down Settings



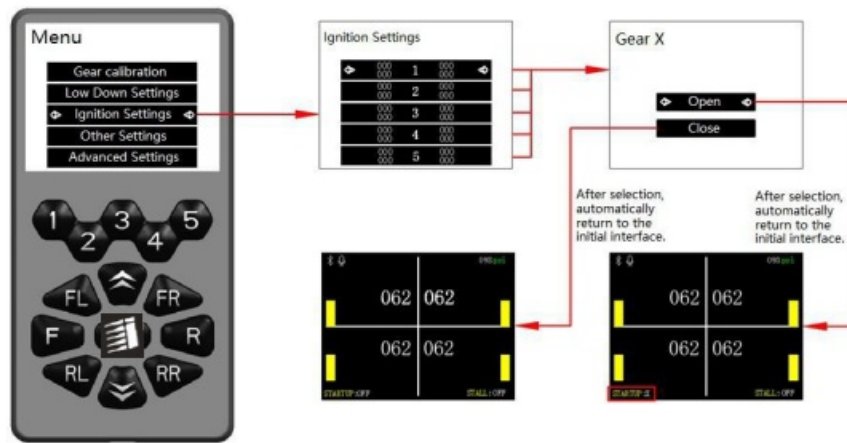
1. Low down Settings

- Long press confirm (logo) button to enter the menu interface, select the low down setting.
- **Low down**
- Choose low down
- After choosing, it will automatically deflate the air springs lowering the vehicle to the lowest stance.

2. Stall low down (Drop when car turns off)

- Choose the stall low down
- Select open to start the stall low down, select close to unselect.
- After selection, the system will automatically deflate the air springs, lowering the vehicle to the lowest stance when the car is turned off.

Set the ignition (Adjust to pre-set on ignition)



1. Set the ignition

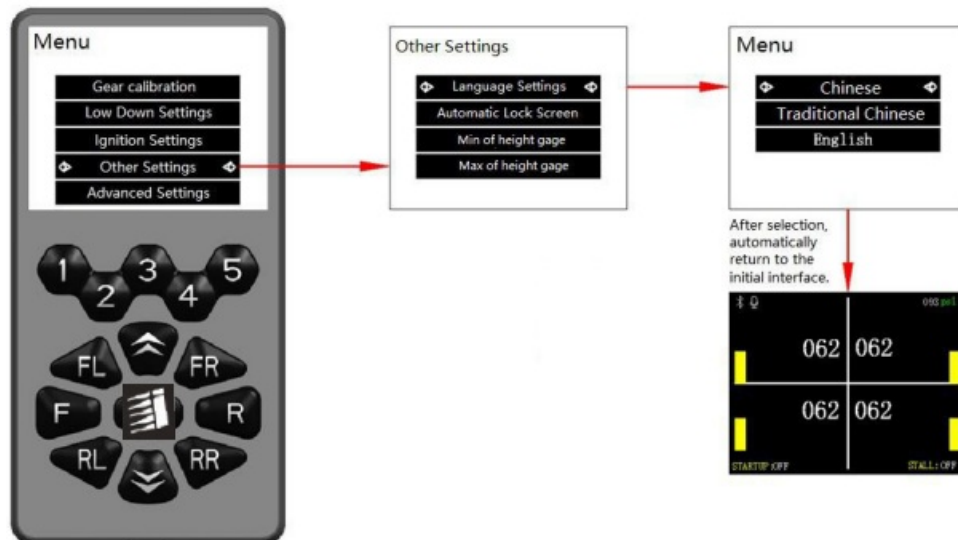
1. Long press confirm (logo) button to enter the menu interface, select the ignition Settings.
2. Select the needed gear (pre-set)
 - **Open**
 - **a)** Select open
 - **b)** After selecting, it will automatically return to the selected pre-set position upon starting the vehicle

2. Close

- **a)** Select close
- **b)** After selecting, it will automatically return to the initial interface.

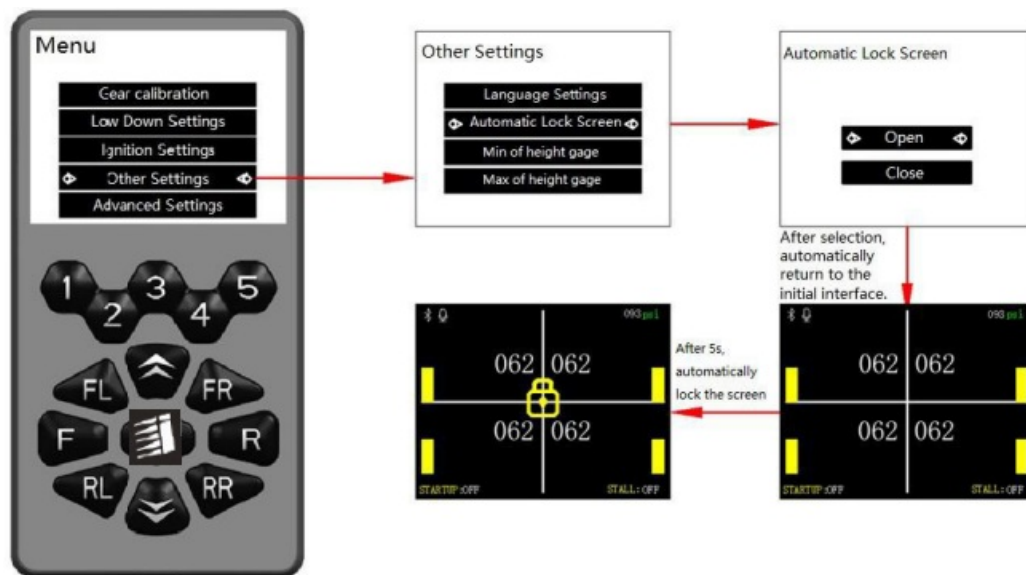
Other Settings

Language Settings



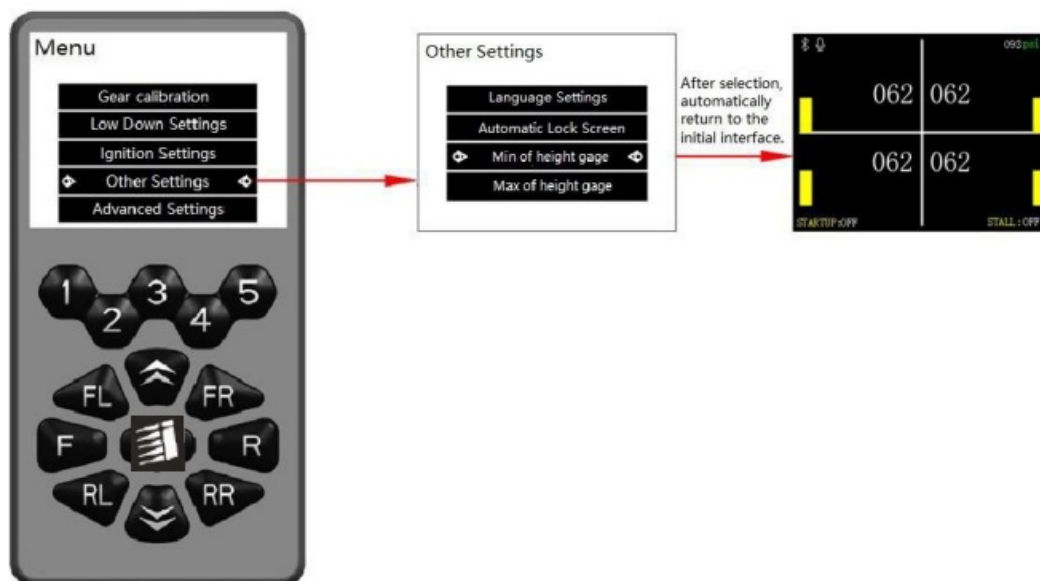
1. Long press confirm (logo) button to enter the menu interface, select the other Settings.
2. Select the language Settings
3. Select the desired language
4. After selecting, it will automatically return to the initial interface.

Automatic lock screen



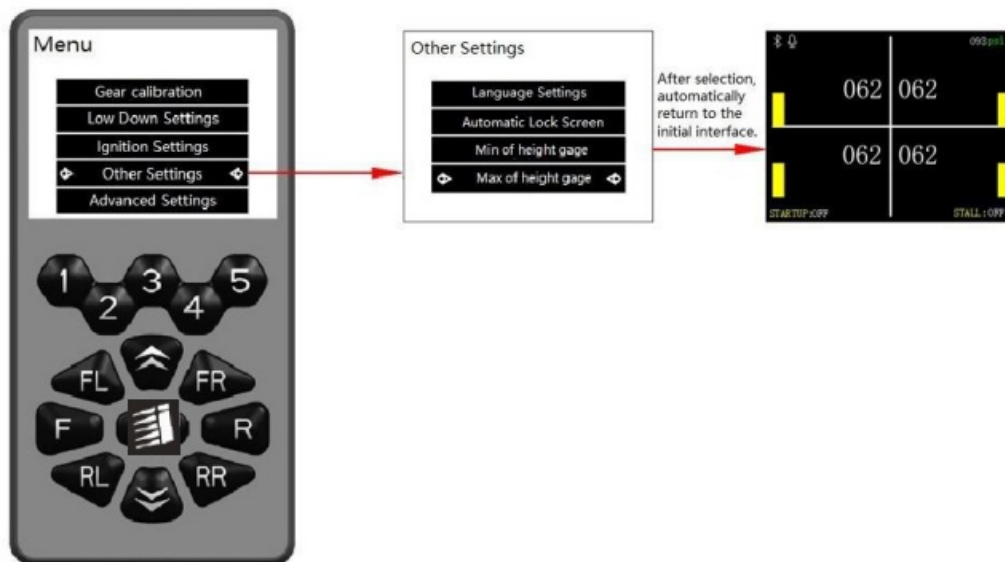
1. Long press confirm (logo) button to enter the menu interface, select the other Settings.
2. Choose to automatically lock screen.
3. Select open.
4. After selecting, it will automatically return to the initial interface, and lock screen automatically after 5 seconds.
5. Double-click the confirm (logo) button, it will automatically return to the main page when unlocked

Minimum value of height gage



1. When height gage is minimum, long press the confirm (logo) button to enter the menu interface, choose other Settings.
2. Choose height gage minimum, calibration airbags pressure at present.
3. After selecting, it will automatically return to the initial interface.

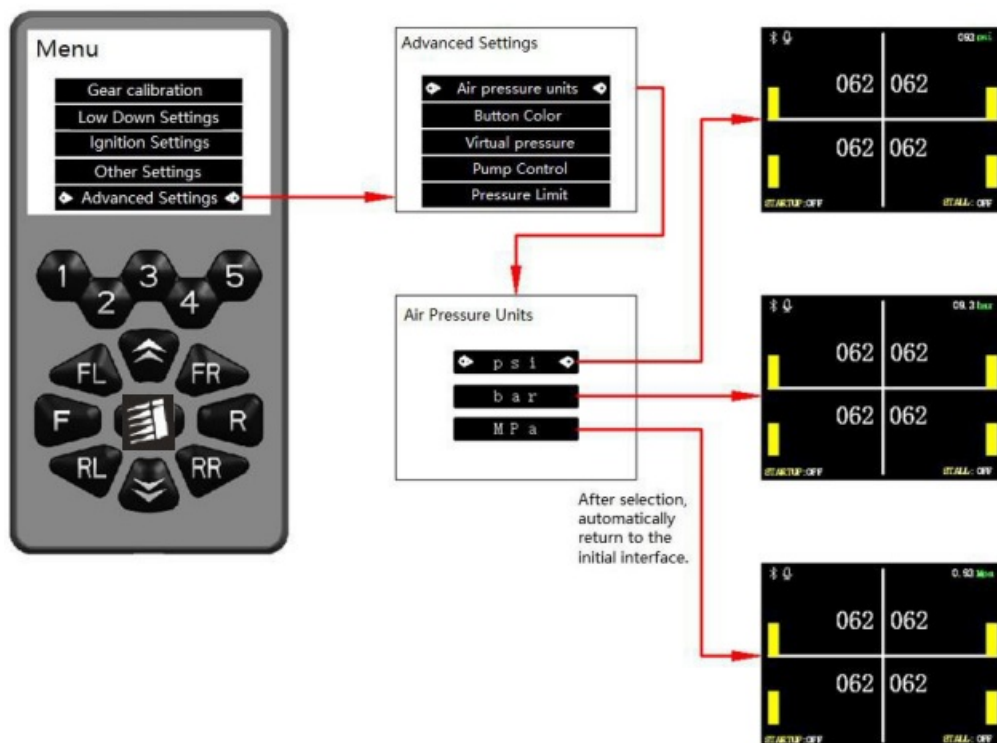
Height gage maximum



1. In height gage maximum, long press the confirm (logo) button to enter the menu interface, choose other Settings.
2. Select the maximum height gage, calibration airbags pressure at present.
3. After selecting, it will automatically return to the initial interface.

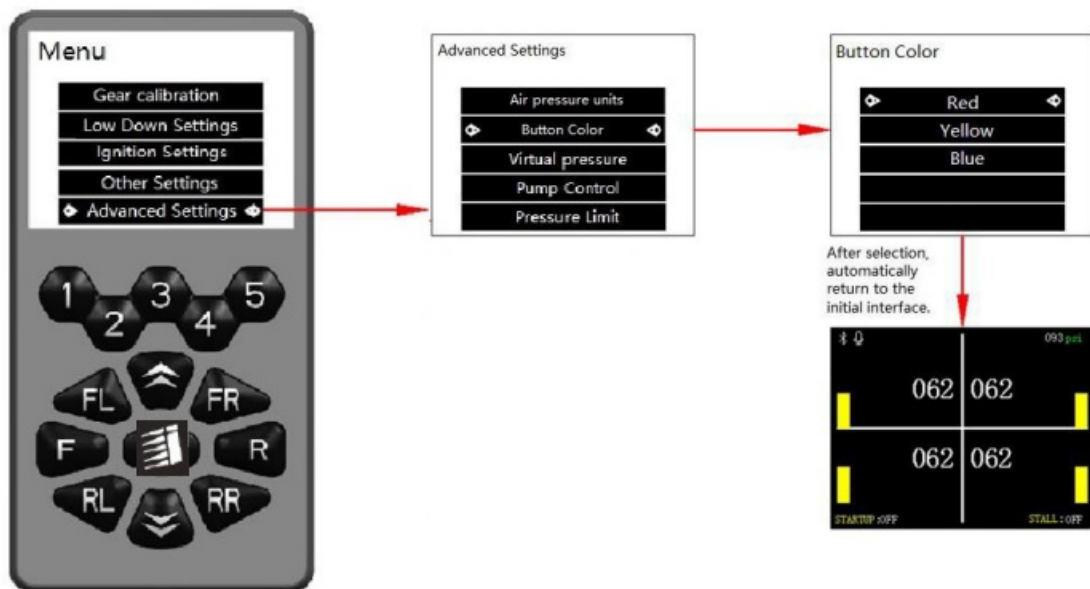
Advanced Settings

Pneumatic unit



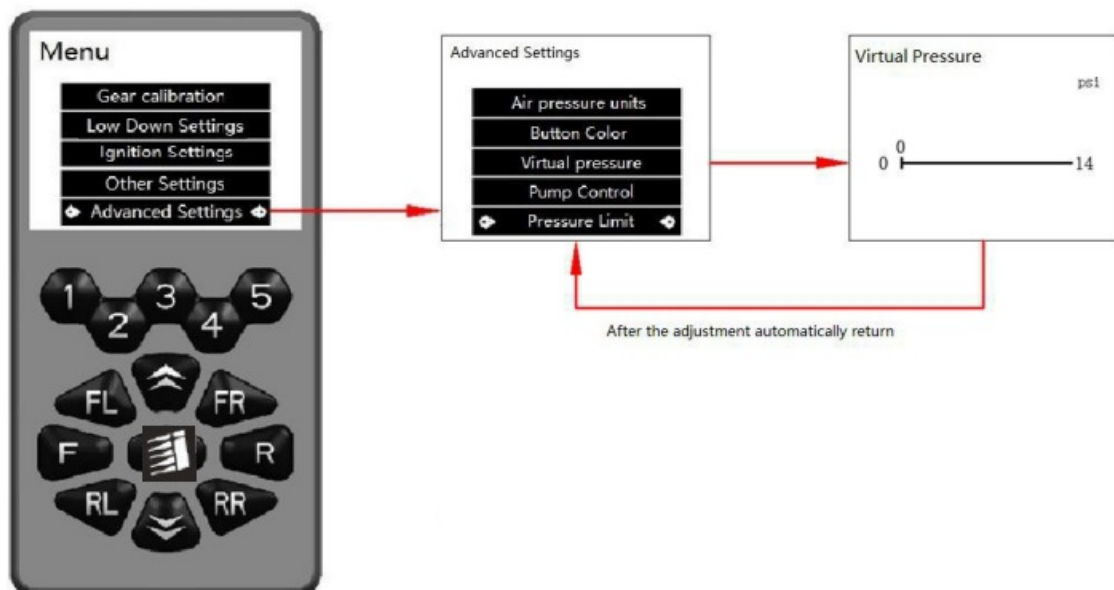
1. Long press confirm button to enter the menu interface, select the other Settings.
2. Select pneumatic unit.
3. Select the needed pressure unit (1 mpa = 10 bar = 145 psi).
4. After selecting, it will automatically return to the initial interface.

Button color



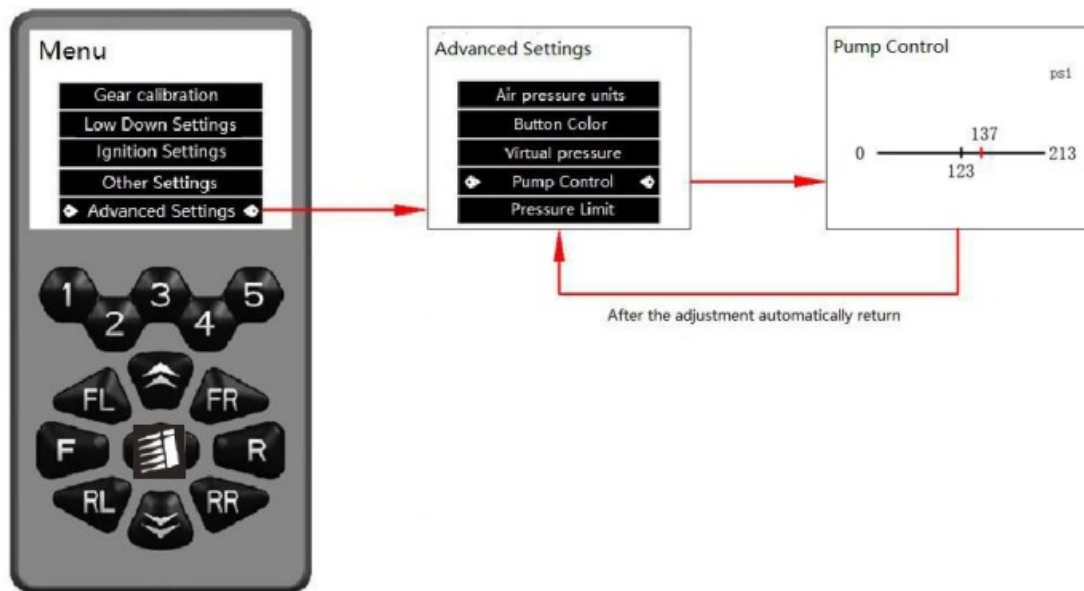
1. Long press confirm (logo) button to enter the menu interface, select advanced Settings.
2. Select the button color.
3. Select the desired color.
4. After choosing, it will automatically return to the initial interface, and modify the color of the button on the remote control.

The virtual pressure



1. Long press confirm (logo) button to enter the menu interface, select advanced Settings.
2. Select the virtual pressure.
3. Use the up and down keys to adjust the virtual pressure required.
4. After the adjustment returns on its own.

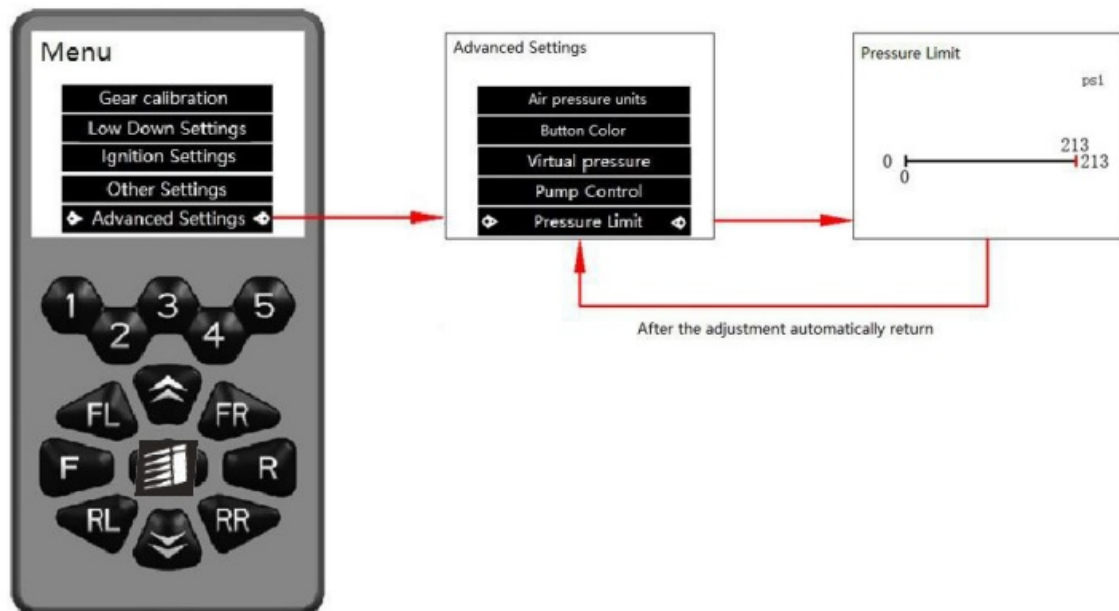
Pump control



1. Long press confirm (logo) button to enter the menu interface, select advanced Settings.
2. Select pump control.
3. Use up and down keys to adjust the air pressure required by black brace.
4. Using F or R key switch brace.
5. After the adjustment returns on its own.

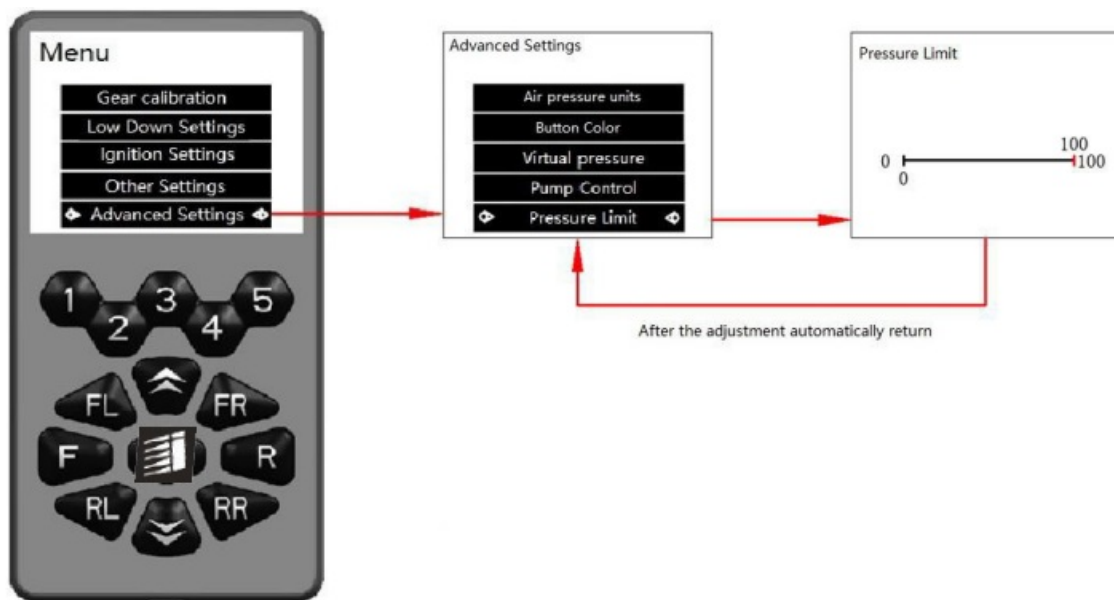
Pressure limit

Air pressure version



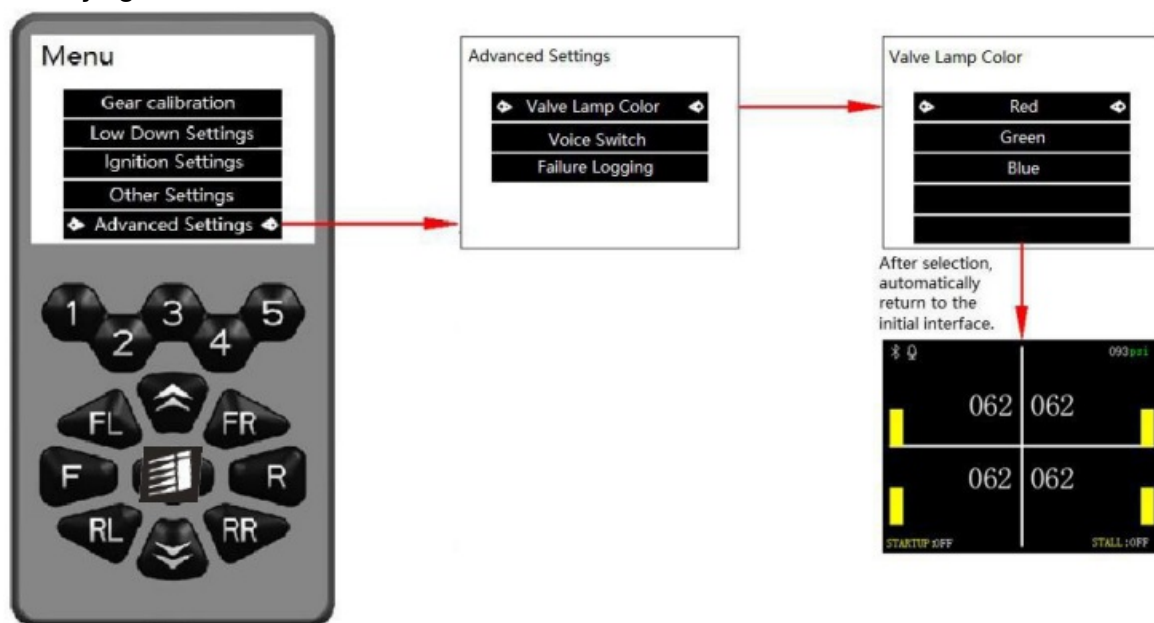
1. Long press confirm (logo) button to enter the menu interface, select advanced Settings.
2. Selection pressure limit.
3. Use the up and down keys to adjust the required pressure limit.
4. After the adjustment returns on its own.

Height gage version



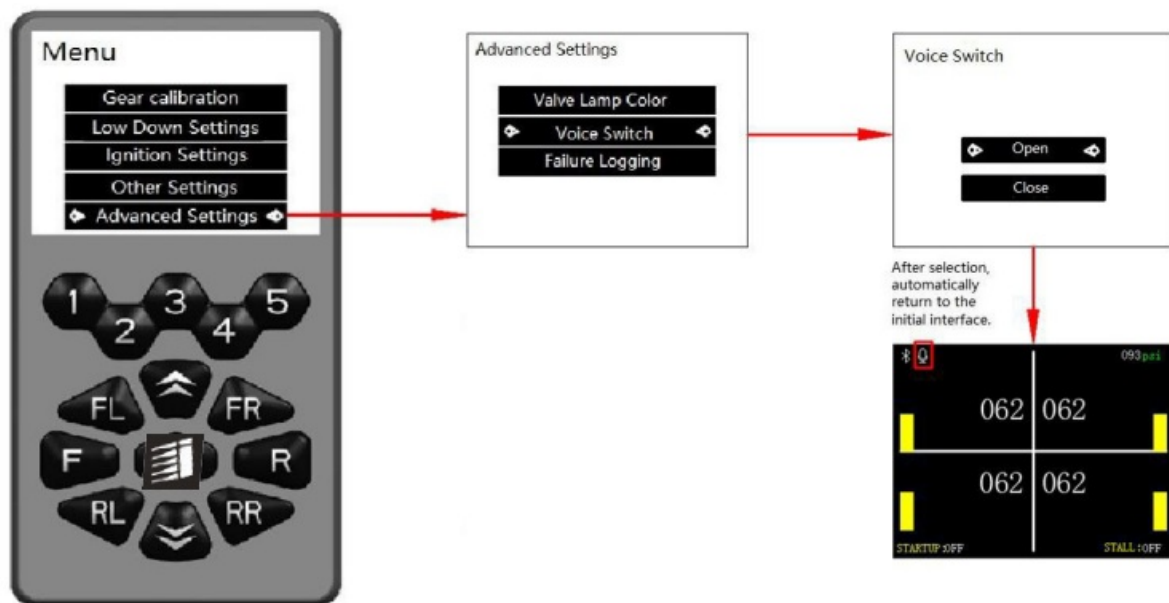
1. Long press confirm (logo) button to enter the menu interface, select advanced Settings.
2. Selection pressure limit.
3. Use the up and down keys to adjust the required height gage percentage limit.
4. After the adjustment returns on its own.

The valve body light color



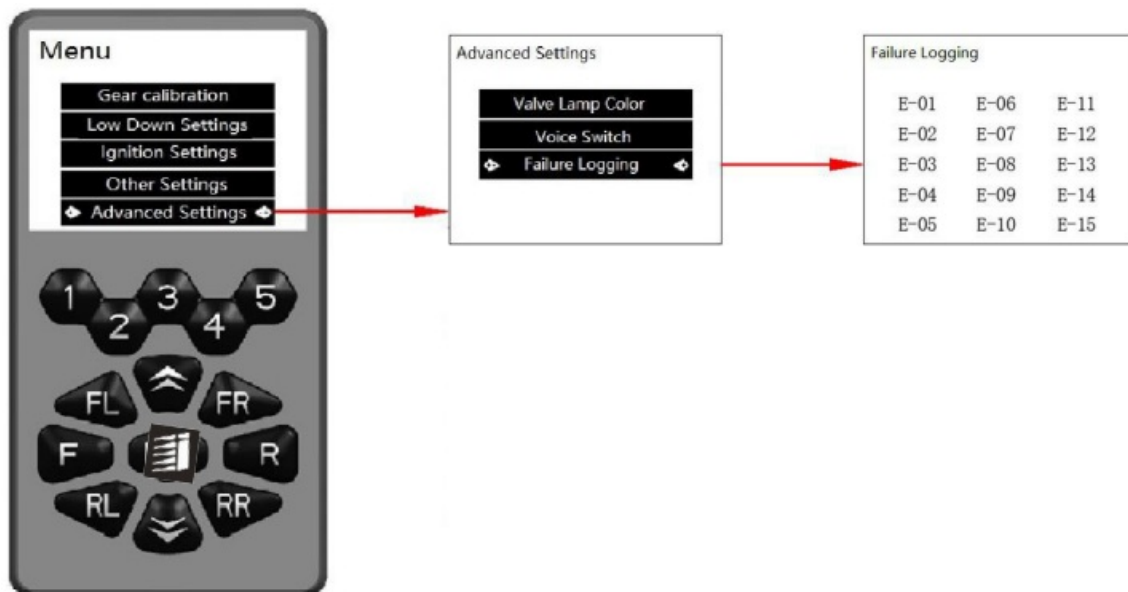
1. Long press confirm (logo) button to enter the menu interface, select advanced Settings.
2. Move the cursor down to the second page.
3. Select the valve body light color.
4. Select the desired valve body light color.
5. After selecting automatically return to the initial interface, and modify the color of lamp body.

Voice switch



1. Long press confirm (logo) button to enter the menu interface, select advanced Settings.
2. Move the cursor down to the second page.
3. Select the voice switch.
4. Choose open or close.
5. After selecting, it automatically returns to the initial interface.

Fault record



1. Long press confirm (logo) button to enter the menu interface, select advanced Settings.
2. Move the cursor down to the second page.
3. After the query returns on its own.

Operational guidelines for voice

Password	Function	Response to broadcast
Xiaodang xiaodang	Wake up	I'm in
Into 1 gear	Into 1 gear	Ding
Into 2 gear	Into 2 gear	Ding
Into 3 gear	Into 3 gear	Ding
Into 4 gear	Into 4 gear	Ding
Into 5 gear	Into 5 gear	Ding
Front axle rise	Front axle rise 0.5s	Ding
Front axle lower	Front axle lower 0.5s	Ding
The left front rise	The left front rise 0.5s	Ding

The left front lower	The left front lower 0.5s	Ding
The right front rise	The right front rise 0.5s	Ding
The right front lower	The right front lower 0.5s	Ding
Rear axle rise	Rear axle rise 0.5s	Ding
Rear axle lower	Rear axle lower 0.5s	Ding
Left rear rise	Left rear rise 0.5s	Ding
Left rear lower	Left rear lower 0.5s	Ding
The right rear rise	The right rear rise 0.5s	Ding
The right rear lower	The right rear lower 0.5s	Ding
Low down	Perform low down	Ding
Open the ignition enter gear	Open the ignition enter gear	Ding
Close the ignition enter gear	Close the ignition enter gear	Ding
Close the language patterns	Close the language module	Call me when needed

Troubleshooting guide

Cable remote control display fault indicator code table

Number	Fault code	Fault code hint	Solve
1	E-01	/	/
2	E-02	Compressor damage	Check whether the Compressor harness connected/direct replace pump
3	E-03	/	/
4	E-04	FL pressure sensor fault	Replace the valve body
5	E-05	/	/
6	E-07	/	/
7	E-06	FR pressure sensor fault	Replace the valve body
8	E-08	/	/
9	E-09	/	/
10	E-10	RL pressure sensor fault	Replace the valve body
11	E-11	/	/

12	E-12	/	/
13	E-13	RR pressure sensor fault	Replace the valve body
14	E-14	/	/
15	E-15	FL height gage sensor fault	Check whether the air pressure sensor is connected/directly replace the sensor.
16	E-16	/	/
17	E-17	FR pressure sensor fault	Check whether the air pressure sensor is connected/directly replace the sensor.
18	E-18	/	/
19	E-19	RL pressure sensor fault	Check whether the air pressure sensor is connected/directly replace the sensor.
20	E-20	/	/
21	E-21	RR pressure sensor fault	Check whether the air pressure sensor is connected/directly replace the sensor.
22	E-22	/	/
23	E-23	Low voltage ignition	/
24	E-24	/	/
25	E-25	Battery low	/
26	E-26	/	/

Leak test and repair

Find the leak point

1. Airtight container pressure change and temperature change is not leakage.


1. Every 5 degrees lower, reduces pressure by 2 psi
2. Caused by system exist in the air pressure changes, such as the air in the pipe.

3. Soap daub in suspicious joint or pipe joint, finished with cloth to wipe clean.
4. Soap and water ratio: 1/5 soap + 4/5 water.
 - **Note:** soap won't corrode metal (aluminum, copper, steel).

2. Leak test

1. Allow the leak rate < 7 SCCM @ – 40 °C (single joint).
2. **For example:**
 1. In 10L jar with 1 MPa pressure, after placed 12 hours of -40 °C, 0.98 MPa.
 2. In 20L jar with 1 MPa pressure, after placed 12 hours of -40 °C, 0.99 MPa.

Documents / Resources

 <small>Electronically Controlled 38 Suspension System (Single Page Version) Product version: 1.0.0</small>	ISAAC 38 ECU System [pdf] Instruction Manual 38 ECU System, 38, ECU System, System
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References

- [User Manual](#)

Manuals+, Privacy Policy

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