METADAMPER

Standard Module

Product Information, User and Installation Manual

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This manual has been prepared to provide information on the safe use, installation, maintenance, service procedures and basic legal requirements of the product.

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Important Warning

MetaDamper is designed to improve operational safety on dump vehicles and assist the driver in hazardous inclination conditions. The system does not replace the driver's attention and responsibility; all site, traffic and occupational safety rules must also be followed.

1. Purpose and Scope of the Manual

This manual provides information on the MetaDamper Standard Module, including product introduction, safe operation, installation, initial commissioning, maintenance and basic inspection procedures.

This manual is intended for vehicle owners, fleet managers, drivers, customer technical teams, installation teams and service personnel. Installation, electrical connection and calibration procedures must be performed by persons with sufficient technical competence to follow this manual.

2. Manufacturer and Support Information

Manufacturer	Metadiag Bilişim Teknoloji Sanayi Ltd. Şti.
Address	Yıldız Teknik Üniversitesi İkitelli Teknopark No:103 Başakşehir / İstanbul
Telephone	0 (212) 549 17 12
Email	info@metadamper.com
Web	www.metadamper.com
Product	MetaDamper Standard Module

Application	Dump trucks, semi-trailers, trailers and similar tipping heavy-vehicle applications
Service life	5 years
Serial number	The product serial number is stated on the product label on the box.
Certification	CE and ISO certification information for the product is included in the product technical file.

3. Product Description and Intended Use

MetaDamper is an electronic dump-body safety system developed to help reduce the risk of rollover in dump trucks and similar vehicles. The system monitors vehicle inclination and movement, provides visual and audible warnings in hazardous conditions, and may intervene in the dump-body raising or lowering circuit depending on the installation configuration.

The standard module operates with a stability module, wiring harness, LED/buzzer warning devices, and pneumatic/electrical connection components selected according to the vehicle configuration.

Main Functions

- Electronic monitoring of vehicle inclination.
- Warning the driver with red/green LEDs and a buzzer when a hazardous inclination is detected.
- Supporting interruption of the dump-body raising circuit when correctly installed.
- Providing an automatic lowering trigger output for vehicles with electrical or pneumatic lowering systems.
- Monitoring system status and performing calibration through the Wi-Fi interface after installation.

4. Package Contents and System Components

Component	Description
MetaDamper Main/Stability Module	Main electronic unit that monitors inclination and system status.
Mounting Support Plate	Used to secure the stability module firmly to the chassis.
Wiring Harness	Used for power, trigger and communication connections.
Coil and Valve Set	Coil and valve components used to intervene in the air circuit according to the hydraulic/pneumatic configuration.
Air Hose	Used for pneumatic connection applications.

Red and Green LED/Buzzer	Warning devices installed within the driver's field of view.
Trailer Interconnection Cable	Used for connections in trailer applications.
Trailer Connection Socket	Used in trailer connection applications.

5. Safety Instructions

Critical Safety Warning

Never enter the space between the chassis and the raised dump body. If technical work is unavoidable, use an appropriate mechanical safety support/block and safely isolate the vehicle energy sources.

- Protective gloves, safety glasses and appropriate personal protective equipment must be used during installation.
- Before installation, position the vehicle on level, secure ground and apply the parking brake.
- The vehicle electrical power supply and relevant energy sources must be safely isolated.
- Exercise caution around sharp-edged, hot, moving or heavy vehicle components.
- Only authorized personnel may remain in the installation area.
- Electrical connections must be made in accordance with the vehicle manufacturer's wiring architecture.
- Do not perform unauthorized work on cables, connectors, valves or the module while the system is energized.
- When the system issues a warning, the driver must stop the operation and check the ground and load conditions.

6. Operating Instructions

6.1 Daily Pre-Operation Check

- Check that the LED/buzzer warning devices are undamaged and within the driver's field of view.
- Check the stability module, wiring harness and connectors for signs of breakage, crushing, looseness or water ingress.
- After starting the vehicle, verify that the system is powered and the normal-status indicator is illuminated.
- Before operating the dump body, ensure that the ground is level, firm and safe.
- Check that the load is evenly distributed in the dump body and that the vehicle capacity is not exceeded.

6.2 Normal Operation

1. Park the vehicle on safe ground and follow all site safety rules.

2. Check the system status indicator. When the green indicator is on, the operation may continue subject to standard safety checks.
3. Start the dump-body raising or lowering operation in accordance with the vehicle manufacturer's instructions.
4. If the system detects a hazardous inclination, the red warning indicator and/or buzzer is activated. Stop the operation immediately.
5. Do not continue raising the dump body until the hazardous condition has been eliminated.
6. After completing the operation, verify that the dump body is fully lowered and closed.

6.3 LED and Buzzer Status Indications

Status	Meaning	User Action
Green indicator	The system is powered and operating conditions are normal.	Continue operation while performing the standard safety checks.
Red indicator	Inclination or system parameters may indicate a hazardous condition.	Stop the dump-body operation and check the ground, load and vehicle position.
Buzzer warning	Critical warning requiring the driver's attention.	Stop the operation and move to a safe condition.
No indicator	There may be a power, connection or system fault.	Secure the vehicle, have the connections checked and contact service.

7. Installation and Commissioning

Installation Responsibility
This manual has been prepared so that the MetaDamper product may also be installed by the customer/user. Installation may be performed by Metadiag technical personnel, the customer/user technical team, or a technically competent person appointed by the customer. The installer is responsible for complying with vehicle electrical wiring requirements, pneumatic/valve connection requirements and basic occupational safety rules. Contact Metadiag technical support before installation whenever there is any uncertainty.

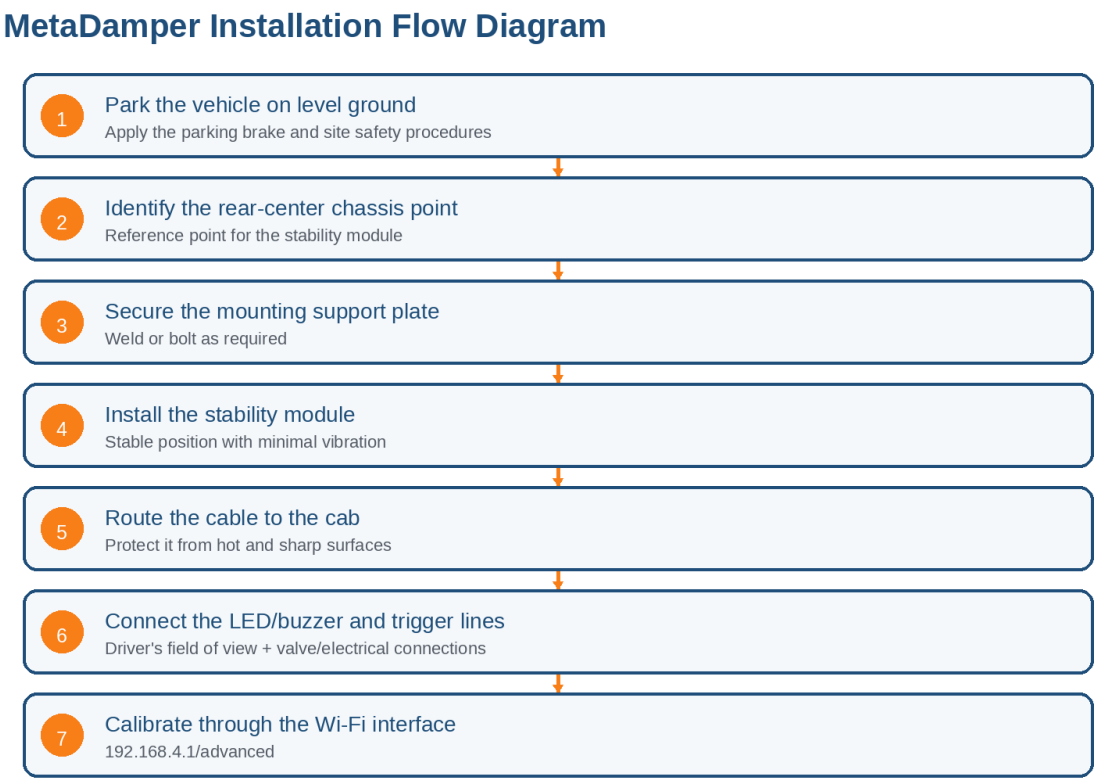


Figure 1. MetaDamper installation flow diagram

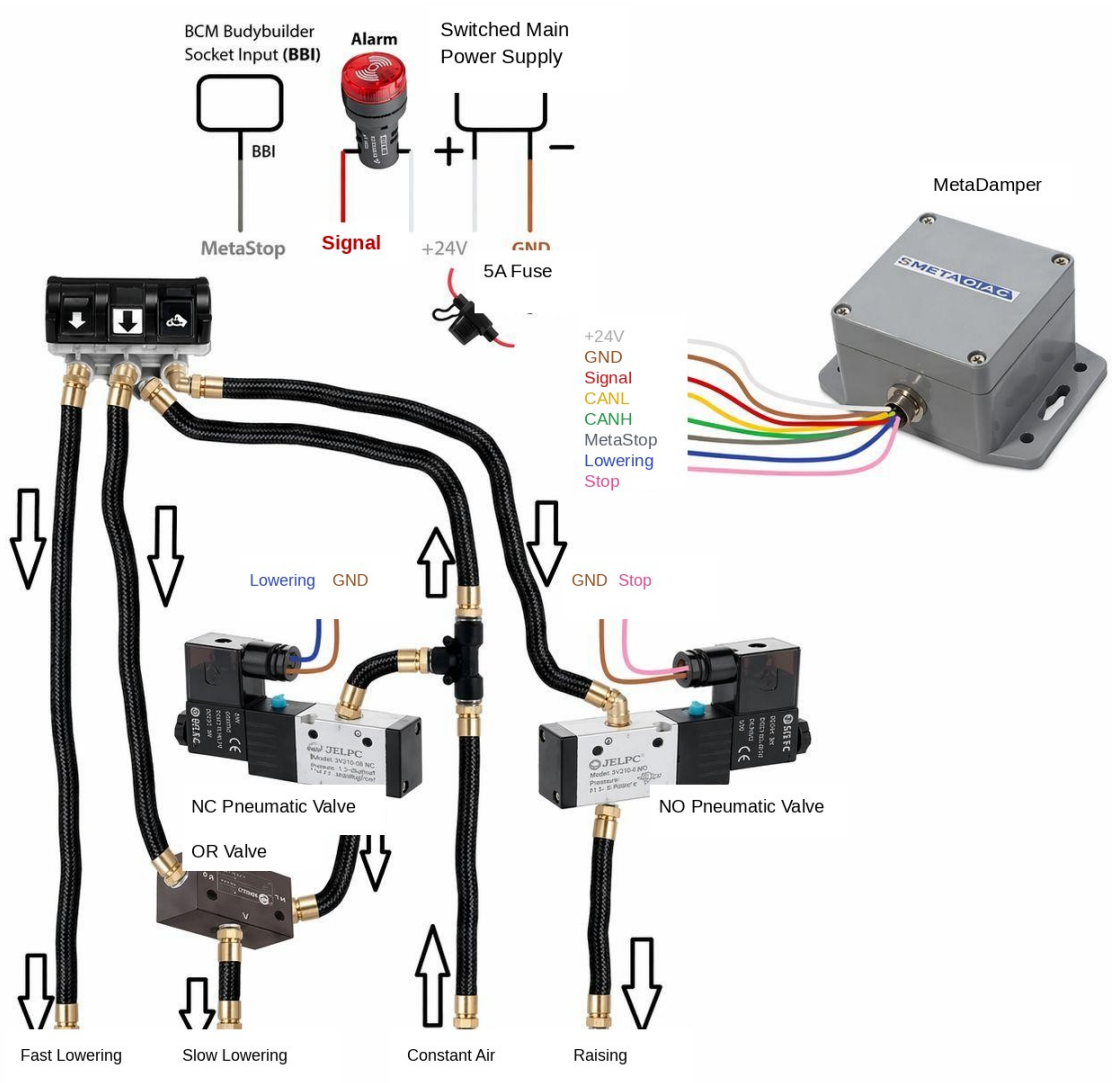
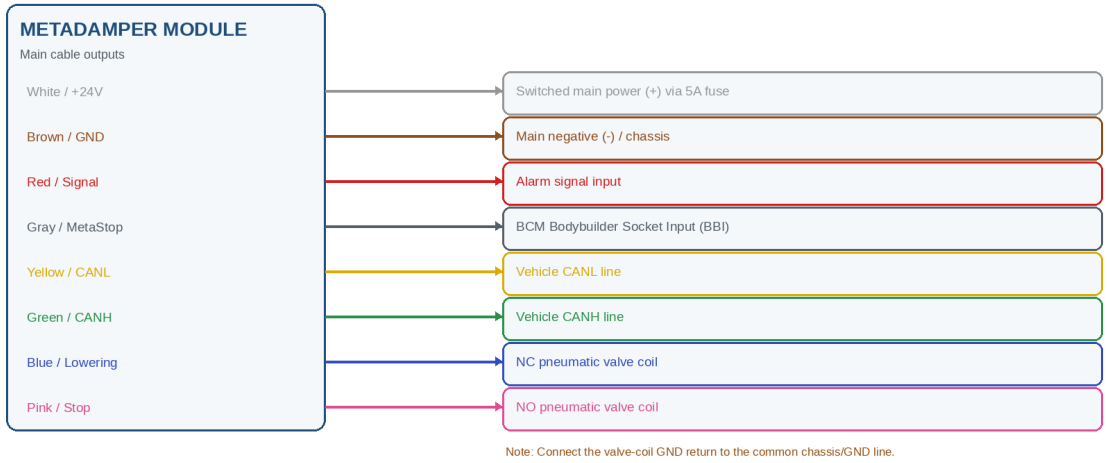


Figure 2. MetaDamper pneumatic and electrical connection diagram

MetaDamper Connection Diagram

Simplified reference based on the original connection image. Verify vehicle-specific connector/pin assignments and valve port directions during installation.

1. Electrical / Cable Connections



2. Pneumatic / Air Line Connection Diagram

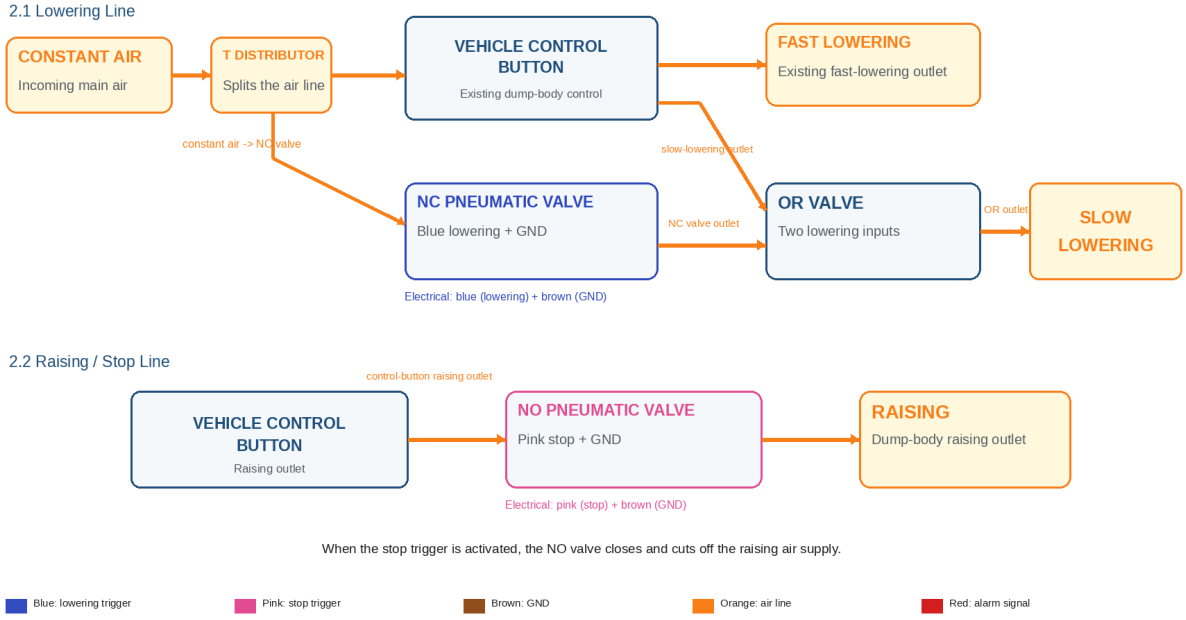


Figure 3. MetaDamper simplified connection diagram

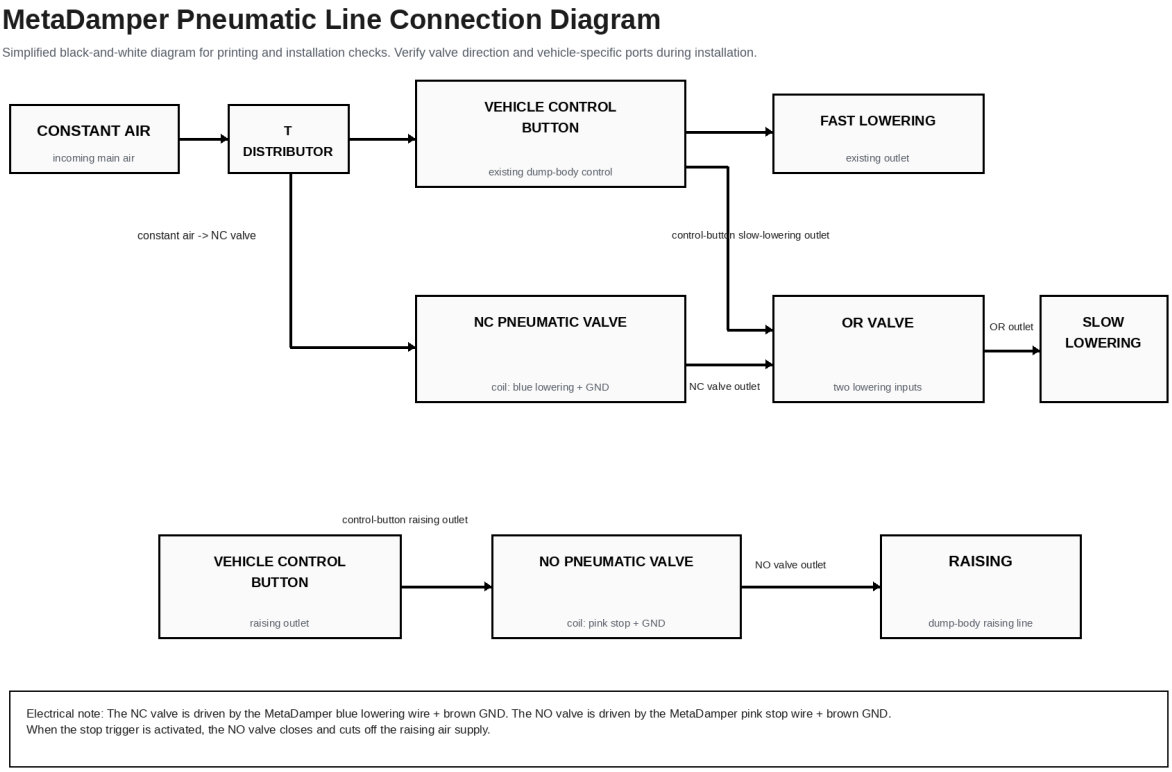


Figure 4. MetaDamper black-and-white pneumatic line connection diagram

7.1 Installing the Stability Module

The stability module must be secured at the rear-center section of the vehicle chassis in a stable position, protected from impact and arranged so that inclination sensing performance is not affected. The red-marked areas in Figure 5 show the recommended rear chassis reference areas for module installation. Use the mounting support plate/bracket when no suitable chassis surface is available.

The purpose of the installation is to create a rigid reference point with minimal vibration that will not affect inclination sensing performance.

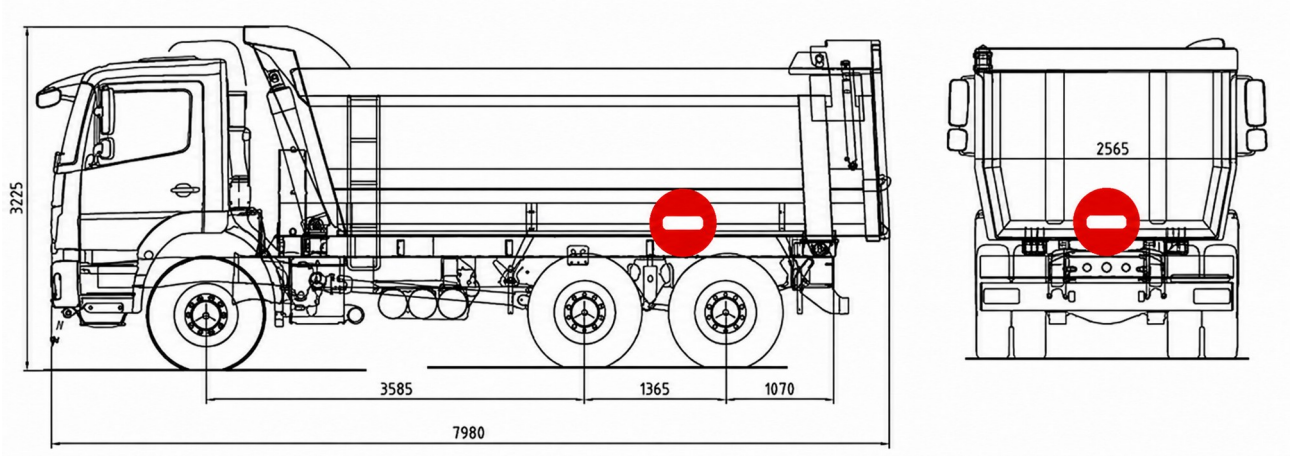


Figure 5. Recommended rear-center chassis installation areas for the stability module (red markers)



Figure 6. Support plate/bracket installation area

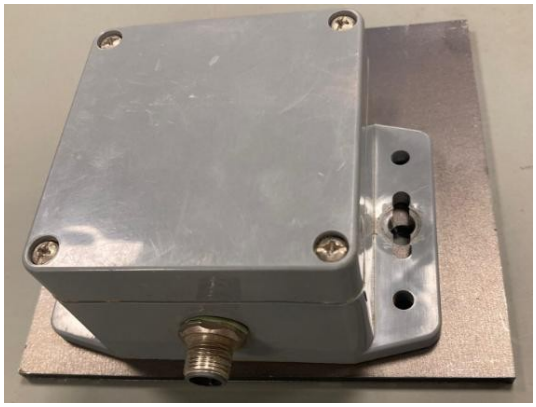


Figure 7. Securing the stability module to the support plate

7.2 Cable Routing

Route the wiring harness from the stability module along the chassis to the cab, following safe paths used by the existing vehicle wiring. Protect the cable from hot surfaces, sharp edges, moving components and potential crushing points.



Figure 8. Cable route along the existing vehicle wiring

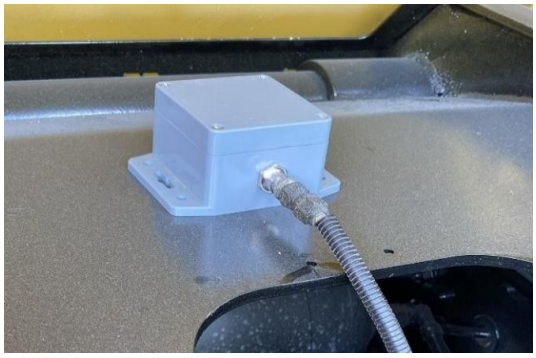


Figure 9. Secured stability module and protected cable outlet

7.3 Electrical Connections

Wire Color	Function
White	24V supply
Brown	GND / chassis
Yellow	CANL
Green	CANH

Pink	Stop trigger
Blue	Lowering trigger
Red	Signal
Gray	Engine E-stop
Red LED	Red (+), white connection



Figure 10. Example installation of the green/red LED-buzzer devices within the driver's field of view

7.4 Vehicles with Hydraulic/Pneumatic Lowering

- Retain the vehicle's existing dump-body control button. The existing fast-lowering line from the button continues through its original circuit.
- Install a T-distributor in the constant air supply line. One outlet feeds the vehicle control button and the other feeds the NC pneumatic valve.
- Connect the slow-lowering outlet from the vehicle control button to one inlet of the OR valve.
- Connect the outlet of the NC pneumatic valve to the other inlet of the OR valve.
- Connect the outlet of the OR valve to the slow-lowering line.
- Connect the MetaDamper blue lowering trigger and brown GND wire to the NC pneumatic valve coil.
- Route the raising line from the vehicle control button into the NO pneumatic valve.
- Connect the outlet of the NO pneumatic valve to the dump-body raising line.
- Connect the MetaDamper pink stop trigger and brown GND wire to the NO pneumatic valve coil. When the system activates the stop trigger, the NO valve closes and cuts off the raising air supply.

7.5 Vehicles with Electrical Lowering

If the vehicle has built-in electrical fast or slow lowering, the blue MetaDamper lowering trigger wire may be connected directly to the relevant lowering wire in the electrical control system without using the

coil/valve assembly. For the stop function, install an NO pneumatic valve in the raising air line and use the pink wire as the stop trigger.

7.6 Software Pairing and Calibration

1. Enable Wi-Fi on your smart device.
2. Connect to the MetaDamper network beginning with '34XYZ34...' in the available network list.
3. Enter http://192.168.4.1 in the browser address bar.
4. Verify that the status screen, inclination data and system menus are displayed.
5. For advanced settings, open http://192.168.4.1/advanced.
6. Check the inclination detection values in the Settings section. Change and save the lateral/longitudinal detection thresholds when required.
7. Calibrate the stability module while the vehicle is on level and secure ground.
8. After calibration, perform a controlled low-risk test to verify the LED/buzzer and trigger outputs.

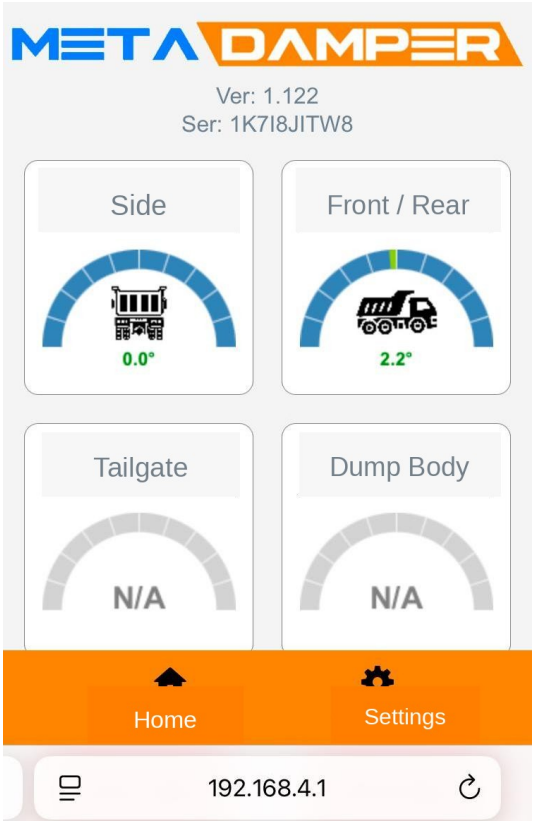


Figure 11. Example MetaDamper interface status screen

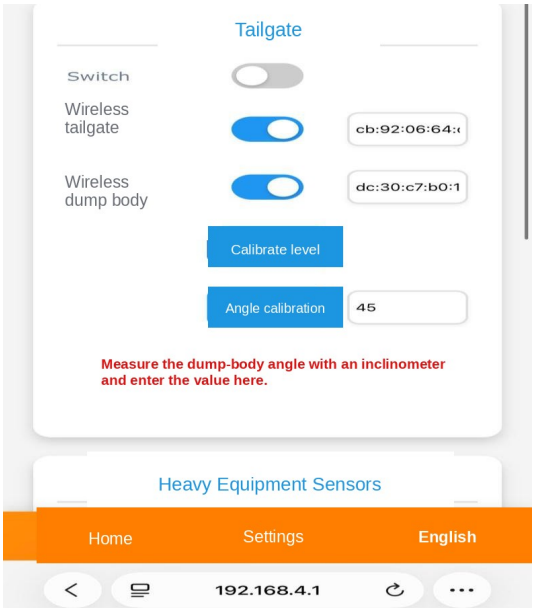


Figure 12. Example interface settings/calibration screen

8. Maintenance, Cleaning and Periodic Checks

MetaDamper is designed for demanding on-vehicle operating conditions. Nevertheless, cables, connectors, mounting points, LED/buzzer devices and valve connections must be inspected regularly.

Frequency	Inspection / Maintenance Task	Responsible Person
Before each use	Check LED/buzzer visibility, cable/connector damage, module fastening and general condition.	Driver / operations supervisor
Weekly	Inspect cable routing, clamps, connector tightness and valve/hose leakage.	Technical team
Monthly	Test system warnings, check LED/buzzer operation and inspect connection points.	Technical team
Every 6 months	Check calibration and verify the mounting point and software parameters.	Customer technical team / Metadiag technical service
Annually	Perform a general system health check, replace components if required, and issue a service report.	Metadiag technical service

Do not direct pressurized water at connectors, cable ends or exposed connection points. Do not use chemical solvents, thinner, fuel or abrasive cleaning agents.

9. Transport, Shipping and Storage

- Transport the product in its original packaging or with impact-absorbing protective material.
- Protect the electronic module and connectors from crushing, dropping, impact, excessive moisture and extreme temperatures.
- Package cables and hoses so that they are not sharply bent and do not contact sharp surfaces.
- The storage area must be dry, clean and protected from direct sunlight.
- After transport and before installation, inspect the package contents and check for physical damage.

10. Misuse and Troubleshooting

10.1 Misuse

- Installation, cable cutting/splicing, valve connection or software parameter changes by unauthorized persons.
- Operating the product outside the specified voltage range.
- Continuing to operate the system despite cable or connector damage.
- Performing technical work while the dump body is raised without a mechanical safety support.
- Continuing to raise the dump body after the system has issued a warning.
- Failure to protect the product properly during vehicle washing, maintenance or welding.

10.2 Basic Troubleshooting

Symptom	Possible Cause	Recommended Action
System does not power on	Power supply, fuse, GND or connector problem.	Secure the vehicle and have the connections checked by the technical team.
LED/buzzer does not operate	The warning-device connection may be loose or damaged.	Have the LED/buzzer connection and cable route checked.
System continuously issues a risk warning	Calibration may be incorrect, the module may have moved, or the vehicle may be on inclined ground.	Move the vehicle to level ground and have the installation and calibration checked.
Dump-body stop/lowering function does not operate	There may be a valve, trigger-wire, air-line or electrical connection problem.	Pneumatic/electrical testing must be performed by the technical team or Metadiag technical service.
Unable to connect to the Wi-Fi interface	The device may be unpowered, out of range, or the SSID may have been changed.	Check the power status and network name; obtain service support if necessary.

11. Technical Specifications

Operating voltage	9-34V DC
Operating temperature	-40°C to +85°C
Protection rating	IP68
Detection inclination	Lateral 5°, longitudinal 13° (default values; adjustable in the Settings section)
Motion detection time	10 s
Maximum power consumption	13.92 W
Connection interface	Local Wi-Fi interface
Calibration address	http://192.168.4.1/advanced

12. Warranty, Service and Spare Parts

MetaDamper is warranted against defects in materials and workmanship for 1 year from the date of purchase. Warranty service and technical service procedures are provided by Metadiag Bilişim Teknoloji Sanayi Ltd. Şti.

Warranty coverage is evaluated in accordance with the warranty certificate, the sales agreement and applicable legislation.

Authorized Service and Spare Parts

Authorized service	Metadiag Bilişim Teknoloji Sanayi Ltd. Şti.
Spare-parts supplier	Metadiag Bilişim Teknoloji Sanayi Ltd. Şti.
Service contact	info@metadamper.com | 0 (212) 549 17 12 | www.metadamper.com

Service Life Note

The service life declared by the company for MetaDamper is 5 years. During the service life, maintenance, repair, service and spare-part requests are handled through Metadiag support channels.

13. Legal Information

This manual has been prepared with consideration for the product information, use, installation, maintenance, basic inspection, service and legal information requirements of the Turkish Regulation on Product Information and User Manuals.

For products supplied in Türkiye, written, audible and visual information on the product or user interface must be provided in Turkish. The manual may be supplied on paper or on a durable data medium; when supplied digitally, access information must be clearly stated on the product, packaging or delivery document.

For sales qualifying as consumer transactions in Türkiye, the optional remedies and application channels under Consumer Protection Law No. 6502 remain applicable. In the event of defective goods, the consumer may, subject to the statutory conditions, request free repair, a price reduction proportionate to the defect, a refund, or replacement with a defect-free equivalent.

Current authorized service and spare-part supply information is published through the Metadiag website and support channels. Where required by applicable legislation, authorized service information is also made available through the Service Information System established by the Ministry of Trade of Türkiye.

Consumers may submit complaints and objections to the competent consumer arbitration committees or consumer courts in Türkiye.

MetaDamper is designed to improve the safety of dump vehicles; it does not eliminate all risks. Drivers, operators and fleet managers remain responsible for complying with traffic rules, occupational health and safety requirements, site operating procedures and vehicle manufacturer instructions.

Energy-Efficient Use

The product is designed as low-power vehicle electronics. For energy-efficient use, avoid unnecessary energization, incorrect wiring, short circuits and damaged cables; after installation, check for leakage current and verify the suitability of the power supply.

Environment and Disposal

Do not dispose of the electronic module, cables, connectors or auxiliary components with household waste. End-of-life products and components must be delivered to authorized collection or recycling channels in accordance with applicable waste electrical/electronic equipment and environmental regulations.

14. Delivery and Inspection Forms

14.1 Post-Installation Inspection Form

Inspection Item	Status
Stability module securely fastened to the chassis.	Pass / Fail
Cable routed and protected from hot, sharp and moving components.	Pass / Fail
24V, GND and trigger connections checked.	Pass / Fail
LED/buzzer installed within the driver's field of view.	Pass / Fail
Valve/hose connections checked for leaks.	Pass / Fail
Wi-Fi interface accessed successfully.	Pass / Fail
Calibration completed on level ground.	Pass / Fail
Controlled functional test completed.	Pass / Fail

14.2 User Delivery, Installation and Commissioning Form

This form records who will perform or has performed the installation, whether user information has been completed, and the commissioning status at product delivery. When installation is to be performed by the customer/user, the safety instructions and connection diagrams in this manual and the vehicle manufacturer's instructions must be followed.

Vehicle registration / ID	
Company / customer name	
Delivery date	
Product serial number	
Installation method	[ ] Installed and commissioned by Metadiag. [ ] To be installed / installed by the customer/user technical team. [ ] Checked / supported by Metadiag after customer installation.
Installer / organization	

Commissioning and calibration status	[ ] Completed [ ] To be completed by the customer/user [ ] Awaiting Metadiag inspection
Information and documents provided	[ ] User manual provided. [ ] Connection diagrams and installation steps explained. [ ] Safety warnings and daily inspection steps explained. [ ] LED/buzzer warning meanings explained. [ ] Wi-Fi interface, settings and calibration screen demonstrated. [ ] Service and spare-parts contact information provided.
User/company declaration	The intended use of the product, safety warnings, installation/calibration steps and service contact information have been explained to us. When installation is performed by the customer/user, we accept that the connection diagrams and safety instructions in this manual, the vehicle manufacturer's instructions and occupational safety rules will be followed.
Comments / notes	
Delivered by	Full name: _____ Position: _____ Signature: _____
Receiving user / company representative	Full name: _____ Position: _____ Signature: _____