HELLA GUTMANN SOLUTIONS

MT 56

Operating Instructions

Original Operating Instructions

BD0006V0000EN1216S0
460 989-62 / 12.16

en

Table of Contents

1 Symbols Used

1.1 Marking Of Text Parts

	**DANGER** Text parts marked in this way indicate an imminent dangerous situation which, if not avoided, will lead to death or severe injuries.
	**WARNING** Text parts marked in this way indicate a potentially dangerous situation which, if not avoided, will lead to dead or severe injuries if it is not avoided.
	**CAUTION** Text parts marked in this way indicate a potentially dangerous situation which, if not avoided, will lead to minor or slight injuries if it is not avoided.
	These symbols indicate rotating parts.
	This symbols indicates dangerous electric voltage/high voltage.
	This symbol indicates the risk of crushing limbs.
	This symbol indicates a potential injury of the hand.
	**NOTICE** All texts marked with **NOTICE** refer to a hazard in the device or environment. The information and instructions set out in them must therefore always be observed.

☞	**NOTE** Texts marked with **NOTE** contain important and useful information. Observance of these texts is recommended.

	**Struck-through waste bin** This symbol indicates that the product must not be discarded as domestic waste. The bar underneath the waste bin symbol indicates that the product has been put on the market after 13 August 2005.

	**Refer to manual** This symbol indicates that the user manual must always be read and always be available.

1.2 Symbols on the Product

	**DANGER** Text parts marked in this way indicate an imminent dangerous situation which, if not avoided, will lead to death or severe injuries.

	**WARNING** Text parts marked in this way indicate a potentially dangerous situation which, if not avoided, will lead to dead or severe injuries if it is not avoided.

	**CAUTION** Text parts marked in this way indicate a potentially dangerous situation which, if not avoided, will lead to minor or slight injuries if it is not avoided.

	**Refer to manual** This marking indicates that the user manual/the operating instructions must always be read and always be available.

	**Direct current voltage** This symbol indicates direct current voltage. Direct current voltage means that the electrical voltage does not change throughout a longer period of time.

	**Polarity** This symbol indicates a plus connection of a voltage source.

	**Ground connection** This symbol indicates a ground connection of a voltage source.

2 User Information

2.1 Safety Precautions

2.1.1 General Safety Notes

- The MT 56 is exclusively intended for use on a vehicle. It is a precondition for the use of the MT 56 that the user has knowledge of automotive engineering and is therefore aware of the sources of danger and risks in the shop and on the vehicle.
- Please read the entire operating instructions thoroughly and, where necessary, the mega macs 56 user manual before using the MT 56. You can also find the user manual under ? in the mega macs 56 or on the DVD enclosed.
- All notes given in the sections of the MT 56 operating instructions and in the mega macs 56 user manual apply. All the symbols on the MT 56 and the following measures and safety precautions must also be observed.
- Furthermore, pay attention to all general instructions from labour inspectorates, trade associations and vehicle manufacturers as well as all laws, legal ordinances and instructions which have to be commonly obeyed by a repair shop.

2.1.2 Safety Precautions for the MT 56



In order to avoid incorrect handling and injury to the user or destruction of the MT 56 arising from this, pay attention to the following:

- Protect the MT 56 and the connecting cables from hot parts.
- Protect the MT 56 and the connecting cables from rotating parts.
- Regularly check connecting cables/accessory parts for damage (destruction of the MT 56 due to short circuit).
- Insert the MT 56 into the module slot only in accordance with the operating instructions.
- Keep the MT 56 away from fluids such as water, oil or gasoline. The MT 56 is not waterproof.
- Protect the MT 56 from strong impacts and do not drop it.
- Do not open the MT 56 on your own. Only technicians authorized by Hella Gutmann are allowed to open the MT 56. Warranty and guarantee will be rendered void at any case of unauthorized tampering of the MT 56 or if the protective seal is damaged.
- Immediately contact Hella Gutmann or a Hella Gutmann trading partner in case of any malfunctions of the MT 56.

2.1.3 Safety Precautions for High Voltage/Line Voltage

Very high voltages occur in electrical systems. Due to voltage flashover on damaged components, such as marten damage or touching live components, the risk of electric shock is likely. Voltage flashover can occur e.g. on the primary and secondary side of the ignition system, the connection to the vehicle, the lighting systems or the wiring harness with plug connections. Therefore observe the following:

- Only use power supply cables with grounding contact.
- Only use a checked or the attached power cord.
- Always use the original cable set.
- Do not exceed the voltage limits indicated on the connecting cables.
- The voltage values to be measured must be shielded extra or even twice from dangerous line voltage. The voltage limits printed on the test leads must not be exceeded. Pay attention that the allowed measuring range of 60 V/DC / 42 V peak is not exceeded when measuring positive and negative voltage at the same time.
- Regularly check cables and adapters for damage.
- Perform any assembly work such as the connection of the MT 56 to the vehicle or the replacement of components only when ignition is switched off.
- Do not touch live components when working with ignition switched on.

2.1.4 Safety Precautions – Risk Of Injury

When working on the vehicle, there is a risk of injury through rotating parts or rolling of the vehicle. Therefore observe the following:

- Protect vehicle against rolling away.
- Additionally place selector lever of automatic transmission vehicles to park position.
- Deactivate the start/stop system to avoid an inadvertent engine start.
- Connect the MT 56 to the vehicle only with engine shut down.
- Do not reach into rotating components when engine is running.
- Do not run cables near rotating parts.
- Check the high-voltage parts for damage.

2.1.5 Safety Precautions Regarding the Risk of Pinching/Crushing

Pay attention not to pinch or crush any limbs when removing/ inserting the MT 56 in the mega macs 56. Therefore observe the following:

- Pay attention not to reach into the danger zone when inserting the module into the device.

2.1.6 Safety Precautions for Hybrid/Electric Vehicles

Very high tensions occur on hybrid and electric vehicles. Due to voltage flashover on damaged components, such as marten damage or touching live components, the risk of electric shock is likely. High voltage at or in the vehicle can lead to death in case of inattention. Therefore observe the following:

- Only the following qualified employees are allowed to de-energize the high-voltage system:
  - High-voltage technician
  - Skilled electrician for predetermined operations – Hybrid or rather electric vehicles
  - Skilled electrician
- Place warning signs and warning tapes.
- Check the high-voltage system and the high-voltage lines for damage (visual inspection!).
- De-energizing the high-voltage system:
  - Switch off ignition.
  - Disconnect the service disconnect plug.
  - Remove the fuse.
- Securing the high-voltage system against re-activation:
  - Withdraw the ignition key and keep it safe.
  - Keep the service disconnect plug safe or secure the battery master switch against re-activation.
  - Insulate the battery master switch, the plug connections etc. with dummy plugs, covering caps or insulating tape with the corresponding warning notice.
- Check the de-energized state with a voltage tester. Even with disconnected high-voltage system, residual voltage can still be present.

	• Ground and short-circuit the high-voltage system (necessary only if voltage is higher than 1000 V). • Voltage below 1000 V: Cover the parts which are close to the system or which are energized e.g. with insulating cloth, hoses or plastic coverings. Voltage higher than 1000 V: Cover the parts with insulating plates/protective panels specially developed for this purpose so that sufficient protection against contact to adjacent parts is ensured. • Regard the following before re-energizing the high-voltage system: – All tools and utilities are removed from the hybrid/ electric vehicle. – Remove the grounding and short circuit of the high-voltage system. No cable must be touched now. – Attach the protective panelling that has been removed before. – Remove the protective measures at the switching system.

2.2 Disclaimer

2.2.1 Burden of Proof on the User

The burden of proof is on the user of the device, that he has paid attention to technical explanations, notes on operation, equipment care as well as maintenance and safety without exception.

2.2.2 Documentation

The notes given in the device describe the most common fault reasons. However, there are often further reasons for existing faults, which cannot be listed here, or there are further sources of error, which are unknown yet. Hella Gutmann Solutions GmbH does not accept any liability for failed or unnecessary repair work.

Hella Gutmann Solutions GmbH does not accept any liability for the use of data and information that is found to be incorrect, or was incorrectly

displayed, or for errors occurring inadvertently during compilation of the data.

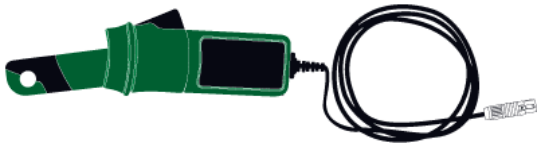
Without limitation on the aforementioned, Hella Gutmann Solutions GmbH does not accept any liability for any loss of profit or of assets, or any other loss, including financial loss.

Hella Gutmann Solutions GmbH accepts no liability for damages or operating trouble resulting from failure to observe the "mega macs" user manual and the special safety precautions.

The burden of proof is on the user of the device, that he has paid attention to technical explanations, notes on operation, equipment care as well as maintenance and safety without exception.

3 Device Description

3.1 Delivery Contents

Pieces	Designation	
1	MT 56	
1	Clamp meter green (optional)	
1	Clamp meter blue (optional)	
1	Red/black test lead (optional)	
1	Black/blue test lead (optional)	
1	Quick start guide	

3.1.1 Checking Delivery Contents

Please check the delivery contents upon receiving your device so that complaints can be issued immediately regarding any potential damage.

Proceed as follows to check the delivery contents:

1. Open the package supplied and check for completeness based on the delivery slip.

2. Take the MT 56 out of the packaging.

	**CAUTION** Danger of short circuit due to loose parts in or at the MT 56 Danger of destruction of the MT 56 and/or the automotive electronics Never put the MT 56 into operation if you suspect that there are loose parts in or at the module. Please contact the Hella Gutmann repair service or a Hella Gutmann trading partner immediately in this case.

3. Check the MT 56 for mechanical damage and shake it slightly to ensure that there are no loose parts inside.

3.2 Intended Use

The MT 56 is a measurement module with a 2-channel oscilloscope. Channel 1 (ports CH1 and ST3) is intended for measuring resistance and current. Channel 2 (port CH2) is intended for measuring voltage only.

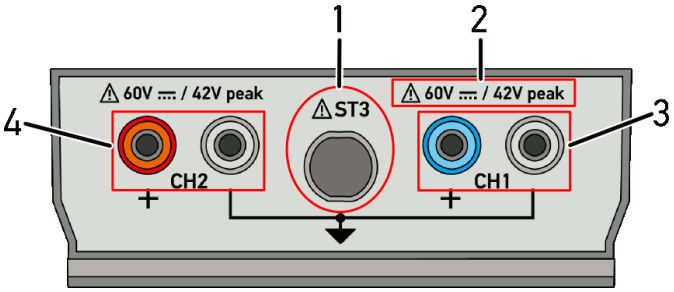
Voltage at the measuring ports CH1 and CH2 of the MT 56 must not exceed 60 V/DC and 42 V peak. If it should be nevertheless higher than 60 V/DC und 42 V peak, overvoltage can occur which leads to destruction of the MT 56 and or the device. The voltage values to be measured must be shielded extra or even twice from dangerous line voltage. There is a risk of electric shock.

The MT 56 can be operated only in connection with the mega macs 56 of Hella Gutmann. Diagnostic devices from other manufacturers will not be supported. The MT 56 is *not* suitable for the following repair work/voltage measurements:

- Electric appliances and devices
- Home electrics
- Power supply systems/line voltage

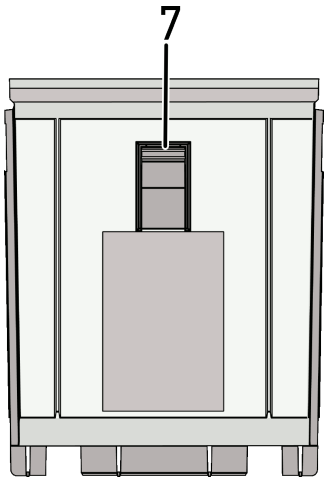
If the MT 56 is used in a way not authorized by Hella Gutmann, the protection of the MT 56 and the mega macs 56 may be influenced.

3.3 Module Front



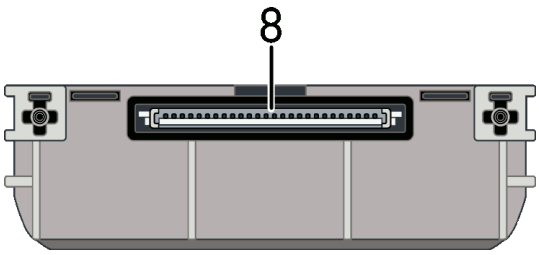
	Designation
1	**ST3 connection** Connect the blue and the green clamp meter here.
2	**Input voltage** Here the device indicates the max. input voltage of the measuring connections.
3	**Ports Scope 1 (CH1)** Connect the test leads to Scope 1 (CH1) here. • blue = signal • black = ground
4	**Ports Scope 2 (CH2)** Connect the test leads to Scope 2 (CH2) here. • red = signal • black = ground

3.4 Module Bottom Side



	Designation
7	**Unlocking button** Use the button to unlock and remove the MT 56 from the mega macs 56.

3.5 Module Back



	Designation
8	**Interface** This interface enables the direct communication of MT 56 and mega macs 56.

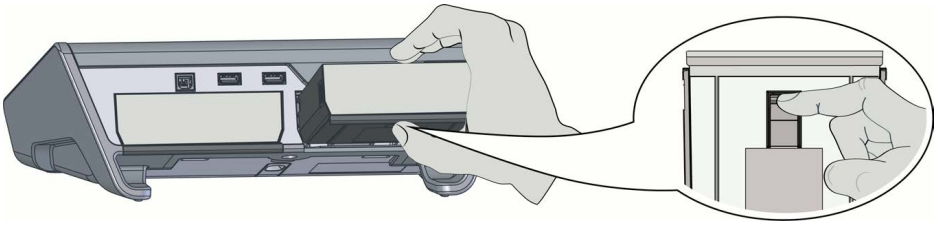
4 Putting Into Operation

This section describes the insertion of the MT 56 into the mega macs 56.

4.1 Inserting The MT 56 Into The mega macs 56

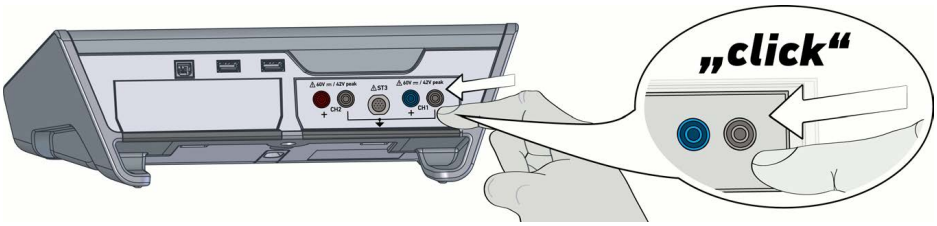
Proceed as follows to insert the MT 56 into the mega macs 56:

1. Push the release button of one of the modules at the mega macs 56.



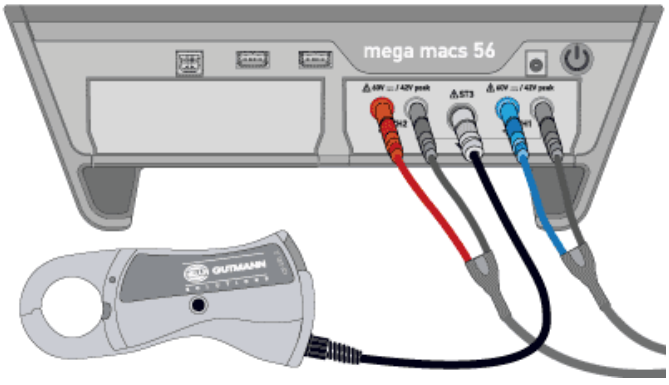
The module releases from the module slot.

2. Draw the module out of the module slot.
3. Insert the MT 56 into the free module slot, pay attention that it locks into place.

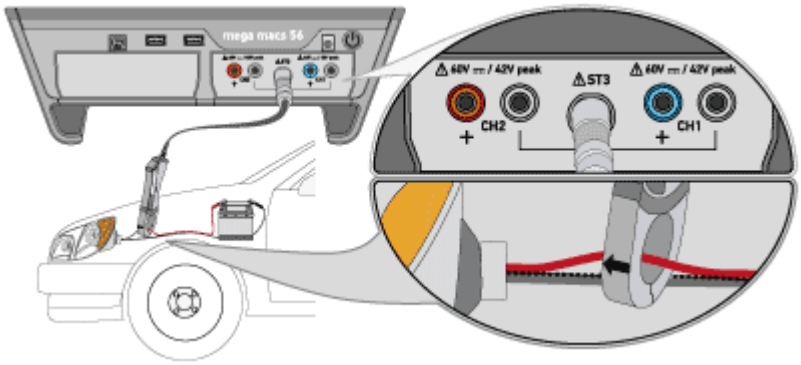


4. Should you once not use the MT 56, then remove all connections/test leads from the MT 56 and disconnect the mega macs 56 from voltage supply.

4.2 Connecting The Test Lead To The MT 56



4.3 Connecting The Current Clamp To Vehicle And MT 56



5 General Information

5.1 Care

Like every device, the MT 56 must be handled with care. Therefore observe the following:

- Regularly clean the device with non-aggressive cleaning agents.
- Use commercial household cleaning detergents and a moistened, soft cleaning cloth.
- Replace damaged cables/accessories immediately.

5.2 Disposal

☞	**NOTE** The guidelines listed here are exclusively valid within the European Union.

In compliance with Directive 2012/19/EU of the European Parliament and Council of 4 July 2012 relating to Waste Electrical and Electronic Equipment (WEEE), and the German national statute governing the distribution, return and environmental disposal of electrical and electronic equipment (Electrical and Electronic Equipment Act – ElektroG) of 16 March 2005, we are obliged to take back this device, distributed by us after 13 August 2005, at the end of its service life free of charge and to dispose of it in accordance with the above-mentioned directives.

Since, in the case of the present device, this relates to exclusively commercially used equipment (B2B), it must not be handed over to a public disposal facility.

The device can be disposed of at the following address (specifying the date of purchase and the device numbers):

Hella Gutmann Solutions GmbH

Am Krebsbach 2

79241 Ihringen

GERMANY

WEEE reg. no.: DE 25419042

Phone: +49 7668 9900-0

Fax: +49 7668 9900-3999

Mail: info@hella-gutmann.com

5.3 Technical Data of the MT 56

Supply voltage	5 V ⎓ (through module interface)
Power input	2.5 W
Current consumption	max. 500 mA, standard 300 mA
Ambient temperature	Recommended: 10...35 °C Working range: 0...40 °C
Suitable for humid environment?	No
Altitude	max. 2000 m above NHN (normal height null)
Relative air humidity	approx. 10...90 %
Continuous operation	Yes
Weight	approx. 220 g
Dimensions	40 x 110 x 140 mm (H x W x D)
Type of protection	IP20
Bandwidth	max. 100 kHz
Sampling rate	1 MSa/s
Amplitude resolution	12 bit
Overload protection	max. 200 V
Measuring channels	2

Measured variables	• Voltage • Current (external clamp meter) • Resistance
Interfaces	• 4x safety socket 4 mm (2 per measuring channel) • 1x ST3 (12-pin) ST3 connection: • 6x communication • 1x voltage inlet 10-15 V • 1x voltage output +17 V • 2x scope (+/-) • 1x hardware detection (coding) • 1x ground

Vertical deflection factor	
Operating mode	Channel 1 or channel 2 single, channel 1 and channel 2 parallel
Tolerance	5 % from end of range
Input impedance	0.5 MOhm
Input coupling	DC, AC
Input voltage	60 V ⎓ / 42 V peak

Range	
Current	• **Blue clamp (CP 700)** – Measuring range: ± 700 A – Current load: max. 25 mA • **Green clamp (CP 40)** – Measurable current: -10 - 40 A – Current load: max. 25 mA
Resistance	• **Measuring range:** 10 Ohm - 1 MOhm • **Measurable resistance:** approx. 1 MOhm

Horizontal deflection factor	
Time coefficient	5 ms - 200 s
Tolerance	100 ppm

Trigger	
Trigger mode	automatic (standard), normal
Trigger level	automatically: The trigger level is adapted to the input signal. manually: The trigger level can be selected individually.
Trigger channel	Scope 1: Standard Scope 2: Individually
Trigger edge	positive negative

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