

# SCOPELITE TIMING LIGHT

## OPERATING MANUAL



**ScopeLite**   
MOTORTECH TIMING LIGHT

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# TABLE OF CONTENTS

<b>1 General Information</b> .....	<b>4</b>
1.1 What Is the Purpose of this Operating Manual? .....	4
1.2 Who Is this Operating Manual Targeted to? .....	4
1.3 Which Symbols Are Used in the Operating Manual? .....	4
1.4 Proper Disposal .....	5
<b>2 Safety Instructions</b> .....	<b>6</b>
2.1 General Safety Instructions .....	6
2.2 Special Safety Instructions for the Device .....	7
2.3 Electrostatic Discharge Hazards .....	8
<b>3 Proper use</b> .....	<b>9</b>
3.1 Functional Description .....	9
3.2 Application Range .....	9
<b>4 Product Description</b> .....	<b>10</b>
4.1 Technical Data .....	10
4.1.1 Certifications .....	10
4.1.2 Mechanical Data .....	12
4.1.3 Electrical Data.....	12
4.2 Overview.....	13
<b>5 Operation</b> .....	<b>14</b>
5.1 Preparation for Measurement on Spark Plug Lead .....	14
5.2 Preparing for Measuring on Ignition Coil with BNC Diagnostic Output .....	16
5.3 Indicating and Setting the Timing .....	19
<b>6 Possible Faults</b> .....	<b>21</b>
<b>7 Maintenance</b> .....	<b>22</b>
7.1 Change batteries.....	22
7.2 Spare Parts and Accessories .....	23
7.3 Customer Service Information .....	24
7.4 Returning Equipment for Repair / Inspection .....	24
7.5 Instructions for Packaging the Equipment .....	24

# 1 GENERAL INFORMATION

Read through this operating manual carefully before use and become familiar with the machine. Installation and start-up should not be carried out before reading and understanding this document. Keep this manual readily available so that you can reference it as needed.

## 1.1 What Is the Purpose of this Operating Manual?

This manual serves as an aid for the installation and operation of the product and supports the technical staff with all operating and maintenance tasks to be performed. Furthermore, this manual is aimed at preventing dangers to life and health of the user and third parties.

## 1.2 Who Is this Operating Manual Targeted to?

The operating manual provides a code of conduct for personnel tasked with the set-up, operation, maintenance, and repair of gas engines. A certain level of technical knowledge with respect to the operation of gas engines and basic knowledge of electronic ignition systems are necessary. Persons who are only authorized to operate the gas engine shall be trained by the operating company and shall be expressly instructed concerning potential hazards.

## 1.3 Which Symbols Are Used in the Operating Manual?

The following symbols are used in this manual and must be observed:



### Example

This symbol indicates examples, which point out necessary handling steps and techniques. In addition, you receive additional information from the examples, which will increase your knowledge.



### Notice

This symbol indicates important notices for the user. Follow these. In addition, this symbol is used for overviews that give you a summary of the necessary work steps.



### Warning

This symbol indicates warnings for possible risks of property damage or risks to health. Read these warning notices carefully and take the mentioned precautionary measures.



### **Danger**

This symbol indicates warnings for danger to life, especially due to high voltage. Read these warning notices carefully and take the mentioned precautionary measures.

## **1.4 Proper Disposal**

After the expiration of its service life, MOTORTECH equipment can be disposed of with other commercial waste, or it may be returned to MOTORTECH. We will ensure its environmentally friendly disposal.

## 2 SAFETY INSTRUCTIONS

### 2.1 General Safety Instructions

The following safety instructions must be followed in the area in which the device is operated:



#### High voltage! Danger to life!

While the engine is running, the area around the ignition system especially holds the risk of danger due to high voltage. The following parts should therefore not be touched or removed unless explicitly stated otherwise:

- Ignition coils and caps
- Wires of the high voltage circuit
- In- and output wiring of the ignition controller
- Pickups and their wiring



#### Danger to persons with pacemakers!

Electromagnetic impulses in the wiring of the ignition system may exceed the permissible limits of pacemakers. Persons with pacemakers must therefore not be present in the vicinity of the ignition system being operated. Mark the operating location of the ignition system with the corresponding standardized warning symbol.

MOTORTECH equipment is manufactured as state of the art and therefore safe and reliable to operate. Nevertheless the equipment can cause risks or damages can occur, if the following instructions are not complied with:

- The gas engine must only be operated by trained and authorized personnel.
- Operate the equipment only within the parameters specified in the technical data.
- Use the equipment correctly and for its intended use only.
- Never apply force.
- For all work such as installation, conversion, adaptation, maintenance, and repair, all equipment must be disconnected from the mains and secured against unintentional reactivation.
- Perform only such maintenance and repair work as is described in this operating manual, and follow the instructions given while working. For maintenance of the equipment, only use spare parts supplied by MOTORTECH. Further work must only be performed by personnel authorized by MOTORTECH. Non-compliance with the instructions will void any warranties for the proper function of the equipment as well as the responsibility for the validity of the certifications.
- Safety devices must not be dismantled or disabled.
- Avoid all activities that can impair the function of the equipment.

- Operate the equipment only while it is in proper condition.
- Investigate all changes detected while operating the gas engine or ignition system.
- Ensure compliance with all laws, directives and regulations applicable to the operation of your system, including such not expressly stated herein.
- If the system is not entirely tight and sealed, gas may escape and result in explosion hazard. Upon completion of all assembly works, always check the system's tightness.
- Always ensure adequate ventilation of the engine compartment.
- Ensure a safe position at the gas engine.

## 2.2 Special Safety Instructions for the Device



### High voltage! Danger to life!

Without proper grounding, high voltages of up to 40,000 V can occur. Use the grounding clamp of the grounding cable to ground the device.



### High voltage! Danger to life!

When setting the ignition timing, the following parts may not be touched, since they can carry high voltage of up to 40,000 V:

- high tension lead
- Ignition coil
- Spark plugs
- Center electrode of BNC diagnostic outputs



### Risk of damage resulting from excessive heat!

The engine or parts of the engine become very hot. Avoid any lasting contact between the BNC cable or the grounding cable and any hot points.

## 2 SAFETY INSTRUCTIONS



### **Risk of damage and erroneous measurements**

If the product shows any visible signs of damage (in particular to cables and plugs), safe operation is no longer guaranteed. The product must then not be used any longer.



### **Risk of damage!**

Wrong measurement results can lead to setting a wrong ignition timing and result in engine damage. In order to obtain reliable measurement results, the ScopeLite must be used exclusively with MOTORTECH BNC cables.



### **Risk of damage!**

If you connect the ScopeLite to an unsuitable device, the ScopeLite and the connected device can be damaged.

Therefore, use the ScopeLite exclusively with the supplied high voltage clamp or on MOTORTECH ignition coils with BNC diagnostic output.

### 2.3 Electrostatic Discharge Hazards

Electronic equipment is sensitive to static electricity. To protect these components from damage caused by static electricity, special precautions must be taken to minimize or prevent electrostatic discharge.

Observe these safety precautions while you work with the equipment or in its vicinity.

- Before performing maintenance or repair work, ensure that the static electricity inherent to your body is discharged.
- Do not wear clothing made from synthetic materials to prevent static electricity from building up. Your clothing should therefore be made of cotton or cotton mix materials.
- Keep plastics such as vinyl and styrofoam materials as far away from the control system, the modules, and the work environment as possible.
- Do not remove the circuit boards from the housing of the device.



## 3 PROPER USE

### 3.1 Functional Description

The ScopeLite timing light aids in setting the ignition timing as well as in general control of ignition pulses. There are two options for measuring:

- Using the inductive high voltage clamp specially developed for the ScopeLite, you can measure ignition pulses on the primary and secondary side of the ignition coil.
- Using a BNC cable, you can measure ignition pulses on a BNC diagnostic output of special MOTORTECH ignition coils.

The current ignition timing is indicated on the reference point of the crank shaft or the camshaft by the light beam of the timing light.

### 3.2 Application Range

Using the inductive high voltage clamp, the ScopeLite can sense ignition pulses on unshielded and shielded high tension leads with a maximum diameter of 14.8 mm (0.58"). On special MOTORTECH ignition coils that feature a BNC diagnostic output, ignition pulses can be sensed via a BNC cable. The beam of the ScopeLite indicates the current ignition timing on the reference point of a scale on the crankshaft or the camshaft.

Any use other than the one described in the operating manual shall be considered improper use and will result in the voiding of all warranties.

## 4 PRODUCT DESCRIPTION

### 4.1 Technical Data

#### 4.1.1 Certifications

ScopeLite is certified in compliance with the following regulations:

- EMC Directive 2004/104/EC

The following standards are complied with:

- DIN EN 55011 (2010:05)
- DIN EN 61000-6-3 (2006 – A1:2010)
- DIN EN 61000-6-4 (2007 – A1:2010)

## DECLARATION OF CONFORMITY

The company: **MOTORTECH GmbH**  
**Hogrevestrasse 21-23**  
**29223 Celle**

declares that the product: **ScopeLite timing light**


intended purpose: **Application on engines**

complies with the provisions of the following EC Directives:  
**EMC Directive 2004/104/EC**

under consideration of the following standards:  
**DIN EN 55011 (2010:05)**  
**DIN EN 61000-6-3 (2006 – A1:2010)**  
**DIN EN 61000-6-4 (2007 – A1:2010)**

The marking of the product is:  
**P/N 06.98.100-L**

This declaration is submitted by:  
Name: Florian Virchow Position in company: Managing Director

Celle, dated 7/19/2012  
Place, date   
Legally binding signature

## 4 PRODUCT DESCRIPTION

### 4.1.2 Mechanical Data

#### ScopeLite

Feature	Value
Length	181 mm (7.13")
Diameter	63 mm (2.48")
Weight	550 g (incl. batteries)
Permissible temperature range	-20 °C (-4 °F) to +60 °C (140 °F)
Batteries' operating time	12 hours permanent operation

#### Inductive high voltage clamp

Feature	Value
Length (with connection for BNC cable)	160 mm (6.30")
Width	38 mm (1.50")
Height	89 mm (3.50")
Maximum diameter of the high tension lead	14.8 mm (0.58")
Weight	250 g (0.55 lbs)
Permissible temperature range	-20 °C (-4 °F) to +80 °C (176 °F)

#### BNC connection cable

Feature	Value
Length	5.0 m (200") BNC cables in other lengths are available separately from MOTORTECH.
Permissible temperature range	-20 °C (-4 °F) to +80 °C (176 °F)

### 4.1.3 Electrical Data

Feature	Value
Batteries' operating time (2x-9 V blocks)	12 hours permanent operation

## 4.2 Overview



Item no.	Designation
1	Inductive high voltage clamp
2	ScopeLite
3	BNC cable with grounding cable and grounding clip

The ScopeLite is supplied in a sturdy plastic case to facilitate safe storage.

# 5 OPERATION

## 5.1 Preparation for Measurement on Spark Plug Lead



### Risk of damage!

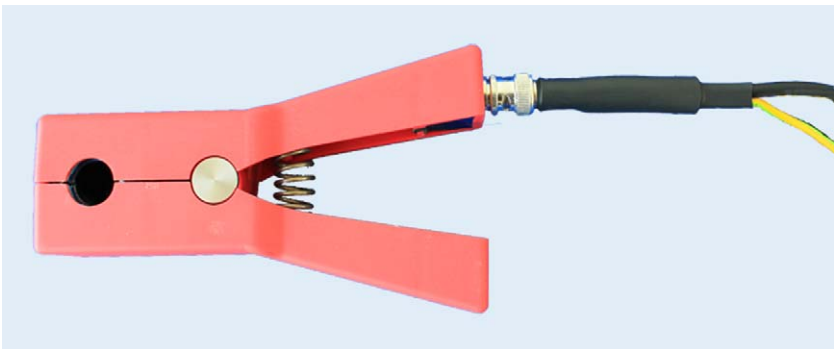
Wrong measurement results can lead to setting a wrong ignition timing and result in engine damage. In order to obtain reliable measurement results, the ScopeLite must be used exclusively with MOTORTECH BNC cables.

Prepare the measurement of the ignition pulses on a spark plug lead as follows:

1. Plug the BNC connector that does *not* have a grounding cable into the ScopeLite.



2. Plug the BNC connector with the grounding cable into the inductive high voltage clamp.



3. Clamp the grounding clip to one of the engine's grounding bolts.

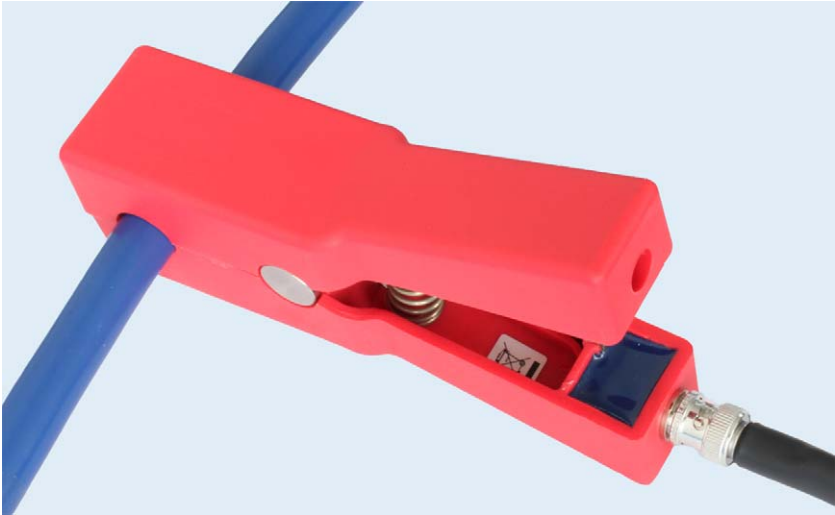


**High voltage! Danger to life!**

Without proper grounding, high voltages of up to 40,000 V can occur. For grounding, attach the grounding clip to one of the engine's grounding bolts.

## 5 OPERATION

4. Clamp the inductive high voltage clamp to the primary or secondary lead of the first cylinder in firing order. (Consult the operating manual of your engine to determine which is the first cylinder in the firing order).



### Maximum diameter of high tension leads

The contact surfaces of the inductive high voltage clamps have to touch each other for the measurement. This is only guaranteed for high tension leads with a maximum diameter of 14.8 mm (0.58").

- ▶ You can indicate and set the ignition timing of your engine (see section *Indicating and Setting the Timing* on page 19).

### 5.2 Preparing for Measuring on Ignition Coil with BNC Diagnostic Output



### Risk of damage!

Wrong measurement results can lead to setting a wrong ignition timing and result in engine damage. In order to obtain reliable measurement results, the ScopeLite must be used exclusively with MOTORTECH BNC cables.



**Risk of damage!**

If you connect the ScopeLite to an unsuitable ignition coil, the ScopeLite and the connected ignition coil can be damaged.

Therefore, use the ScopeLite exclusively on MOTORTECH ignition coils with BNC diagnostic output.

Prepare the measurement of the ignition pulses on a MOTORTECH ignition coil with BNC diagnostic output as follows:

1. Plug the BNC connector that does *not* have grounding cable into the ScopeLite.



2. Clamp the grounding clip to one of the engine's grounding bolts.



## 5 OPERATION



### High voltage! Danger to life!

Without proper grounding, high voltages of up to 40,000 V can occur. For grounding, attach the grounding clip to one of the engine's grounding bolts.

3. Plug the BNC connector with the grounding cable into the BNC diagnostic output of the first ignition coil in the firing order. (Consult the operating manual of your engine to identify the first ignition coil in the firing order).



- ▶ You can identify and set the ignition timing of your engine (see section *Indicating and Setting the Timing* on page 19).

### 5.3 Indicating and Setting the Timing

Identify and change the ignition timing of your engine as follows.

1. Use button **A** to switch on your ScopeLite.



#### Automatic shutdown

ScopeLites of revision 1.1 and higher have an automatic shutdown function. ScopeLite switches off 5 minutes after startup. To reactivate ScopeLite first has to be switched off and then switched on again.

2. Use button **B** to set the sensitivity. The LED between the two buttons indicates the setting:
  - At low sensitivity, the LED lights up **green**.  
Use this setting for **unshielded primary and secondary leads**.
  - At high sensitivity, the LED lights up **red**.  
Use this setting for **primary leads, shielded secondary leads** and for **MOTORTECH ignition coils with a BNC diagnostic output**.



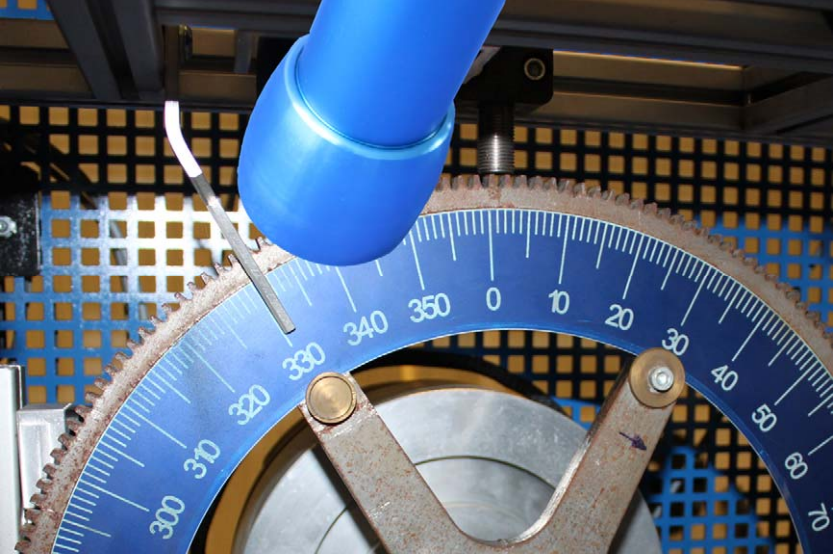
#### Setting sensitivity

Make sure the sensitivity of the timing light has been set correctly, since otherwise you will not receive any useful measurement results.

3. Set the ScopeLite to the reference point on the degree scale of the crankshaft or camshaft. (Consult the engine's operating manual for the degree scale and the reference point to be used).

## 5 OPERATION

- ▶ The current ignition timing is indicated by the light beam of the timing light.



### Setting right scale

Consult the operating manual of your engine to determine whether the degree scale of the crankshaft or the degree scale of the camshaft has to be read in to set the ignition timing.

- ▶ You can vary the ignition timing via the engine control until the desired value has been set.

## 6 POSSIBLE FAULTS

The ScopeLite does not light up.

- **Possible cause**

The batteries are dead.

**Solution**

Change the batteries (see section *Change batteries* on page 22).

- **Possible cause**

A cable has been clamped off or the three-pin connector was not connected while assembling the ScopeLite.

**Solution**

Open the ScopeLite as shown in section *Change batteries* on page 22 and check the wiring.

The values scanned by ScopeLite make no sense.

- **Possible cause**

The ScopeLite is incorrectly set.

**Solution**

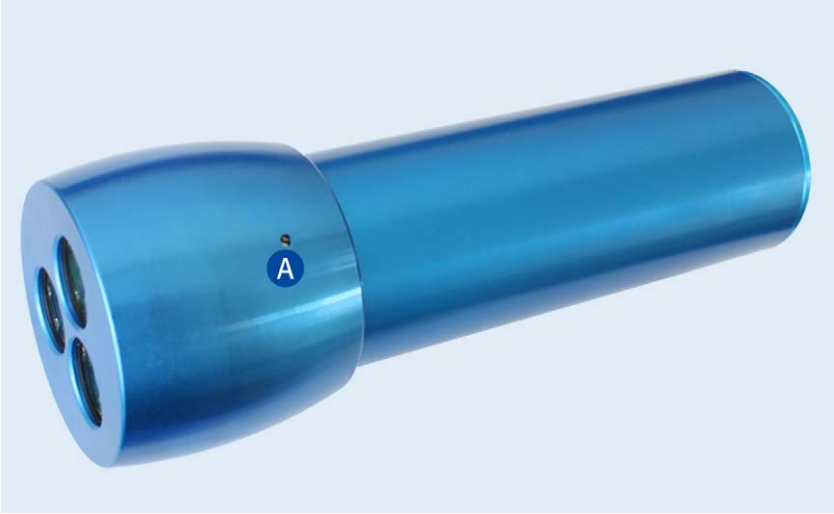
Properly adjust the sensitivity of the timing light (see section *Indicating and Setting the Timing* on page 19).

## 7 MAINTENANCE

### 7.1 Change batteries

Replace dead batteries as follows:

1. Loosen the set screw on the ScopeLite **A** with a small screwdriver.



2. Draw the housing parts apart carefully to remove the batteries from the grip.



3. Carefully detach the empty batteries from the connection clip and insert two new 9-volt batteries.

4. If necessary, reattach the three-pin connector and reassemble the ScopeLite.  
Ensure that the cable does not get caught between the housing parts and that the guide pins sit exactly in the guide bars.



5. Retighten the set screw in the housing.
  - ▶ The ScopeLite is now operational.



#### **Disposal of Batteries**

Dispose of empty batteries in an environmentally responsible manner and complying with local regulations.

## **7.2 Spare Parts and Accessories**

For spare parts and accessories, please refer to our current Product Guide, which is available for you to download on the Internet at [www.motortech.de](http://www.motortech.de).

## 7 MAINTENANCE

### 7.3 Customer Service Information

You can reach our customer service during business hours at the following phone and fax number, or by e-mail:

Phone: +49 5141 93 99 0  
Fax: +49 5141 93 99 99  
E-Mail: [service@motortech.de](mailto:service@motortech.de)

### 7.4 Returning Equipment for Repair / Inspection

To return the device for repair and inspection, obtain a return form and return number from MOTORTECH.

Fill out the return form completely. The completely filled out return form guarantees fast, uncomplicated processing of your repair order.

Send the device and the return form to one of the two addresses below or to the nearest MOTORTECH representative:

#### MOTORTECH GmbH

Hogrevestr. 21-23  
29223 Celle

Germany

Phone: +49 5141 93 99 0  
Fax: +49 5141 93 99 98

[www.motortech.de](http://www.motortech.de)  
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[info@motortechamericas.com](mailto:info@motortechamericas.com)

### 7.5 Instructions for Packaging the Equipment

For return shipment, equipment should be packaged as follows:

- Use packaging material that does not damage the equipment surfaces.
- Wrap the equipment with sturdy materials and stabilize it inside the packaging.
- Use sturdy adhesive film to seal the packaging.





## Original MOTORTECH® Accessories for Stationary Gas Engines

As a supplier, MOTORTECH develops, produces and distributes accessories as well as spare and wearing parts for nearly all kinds of stationary gas engines worldwide: Ignition control and monitoring, industrial spark plugs and high tension leads, wiring systems and gas regulation – from detonation to speed control and complete gas engine management.

On-site support and special training courses complete our service.



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