

SEM 1

Scanning Equipment for Meters

User Manual



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The product information, specifications, and technical data embodied in this manual represent the technical status at the time of writing and are subject to change without prior notice.

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Preface

The purpose of this manual is to familiarize users with the *OSH 256* scanning head and to show how to properly use this device to read pulse LEDs of electronic energy meters.

The manual contains important tips on how to use the *OSH 256* safely, properly, and efficiently. Its purpose is to help you avoid danger, repair costs, and down time as well as to help maintain the reliability and life of the *OSH 256* scanning head.

This manual is to be supplemented by existing national safety standards for accident prevention and environmental protection.

The manual should always be available at the site where the *OSH 256* is used. It should be read by all personnel operating it.

In addition to the manual and the applicable safety regulations in the country and at the site of operation, the usual technical procedures for safe and competent work should be heeded.

Safety Instructions



Before operating the *OSH 256* scanning head, carefully read the following safety instructions.

Only operate the *OSH 256* scanning head after you have read this manual and fully understood the instructions herein.

The *OSH 256* scanning head may only be operated by trained personnel.

Rules for Use

- The *OSH 256* scanning head may only be used in a safe technical condition taking into account its defined purpose, safety requirements and possible risks as well as the operating instructions! Faults that could affect safety are to be immediately eliminated (by specialized personnel or otherwise)!
- The *OSH 256* scanning head are exclusively intended for the application areas specified in chapter 1 "Designated Use" on page 7. The manufacturer/distributors are not liable for damage resulting from unintended usage. The user alone assumes all responsibility and risk.
- Complying with the conditions outlined in the operating instructions of this manual is part of the defined use of the device.

Orderly Practices and Procedures

- This manual should always be available on site where the *OSH 256* scanning head is used.
- Personnel assigned to using the *OSH 256* scanning head must have read this manual and fully understood the instructions herein, in particular the chapter about safety requirements, before starting work. This particularly applies to personnel not working with the *OSH 256* scanning head on a regular basis.

Operator Qualifications

- Testing with the *OSH 256* scanning head should only be carried out by authorized and qualified personnel. The user is responsible for safe operation of the equipment. Please contact your OMICRON representative for dedicated product training support.
- Personnel receiving training, instruction, direction, or education on the *OSH 256* scanning head should remain under the constant supervision of an experienced operator while working with the equipment.

Safe Operation Procedures

- The *OSH 256* scanning head are to be set into operation in accordance with the information provided in chapter 4 "Configuring the Test Universe Software".
- Do not operate the *OSH 256* scanning head under wet or moist conditions (condensation).
- The electric equipment of the *OSH 256* scanning head is to be checked regularly. Any faults such as loose connections or defective cables have to be repaired immediately.
- The *OSH 256* scanning head are SELV devices (**S**afety **E**xtra **L**ow **V**oltage). They may only be connected to external devices that fulfill the SELV requirements according to the standards EN 61010-1 or IEC 61010-1.



1 Designated Use

SEM 1 is an accessory for OMICRON CMC test sets and contains the *OSH 256* passive optical scanning head and an adapter cable for a direct connection to the **ext. Interf.** connector at the rear of CMC test sets.

OSH 256 is designed to read pulse LEDs of electronic energy meters.

The lightweight *OSH 256* scanning head can be attached to smooth surfaces by means of its suction cup or by a re-usable adhesive rubber compound in case of a non-planar surface. The adhesive rubber compound additionally screens the sensor from ambient light.

Any other use of the *OSH 256* is considered improper and may result in damage to property or persons.



Caution: The *OSH 256* is a SELV device (**S**afety **E**xtra **L**ow **V**oltage). Do not connect it to circuits carrying hazardous voltages.

2 Setup

2.1 Connections Before Use

Plug the *OSH 256* connection cable into the according 5-pole connector of the provided adapter cable. The other side of the adapter cable has a 16-pole connector; plug this connector into the **ext. Interf.** connector (counter input) at the rear side of your *CMC 356*, *CMC 353* or *CMC 256plus* test set.



Connections can be made either prior to powering up the CMC test set or while the CMC test set is running. The connection to the CMC test set is used to supply power directly to the *OSH 256* from the CMC test set. Additional power supplies are therefore not required.

2.2 Mounting the OSH 256

Figure 2-1:
OSH 256 suction cup
and adhesive rubber
compound



For best attachment, moisten the suction cup at the rear of the *OSH 256*, especially when the mounting surface has a textured finish. The use of petroleum jelly works particularly well for textured surfaces.

Alternatively, use a strip of the provided adhesive rubber compound (see figure 2-1), shaping it to a ring. Make sure that it does not obscure the sensor lens. This piece of adhesive rubber compound can be reused several times.

Use the alignment marks of the *OSH 256* to make sure that the sensor at the back of the device is centered over the optical source, then press it firmly to expel all the air and fix the cup. A small sliding motion will assist in obtaining a good suction grip.

Make sure that the *OSH 256* is correctly aligned, and reposition if required.



Note: The adhesive rubber compound is very well suited to block emissions from close-by indicators from influencing the *OSH 256* sensor output.

SEM 1 Scanning Equipment for Meters

Figure 2-2:
OSH 256 mounted with
adhesive rubber
compound



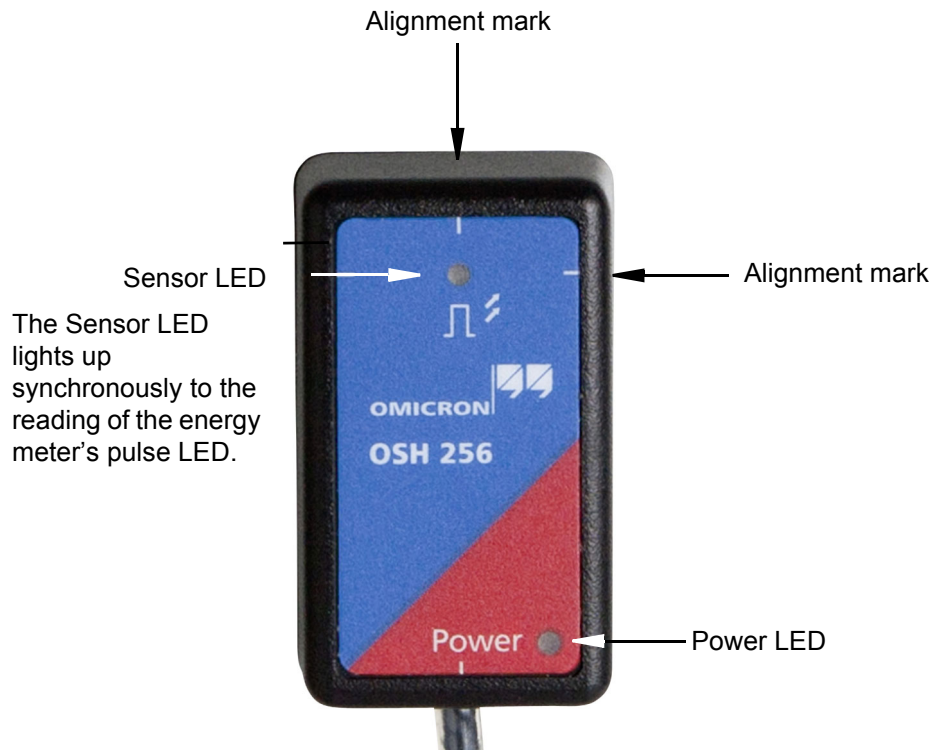
3 OSH 256 Front Panel Indicators



Caution: All connectors on the *OSH 256* are SELV interfaces (Safety Extra Low Voltage). Do not connect any of these connectors to circuits carrying hazardous voltages.

The *OSH 256* has two indicating LEDs as well as four alignment marks. The LEDs are the Power LED and the Sensor LED. The position of the LEDs and alignment marks is shown in the following picture.

Figure 3-1:
OSH 256 front panel indicators



The Power LED is on when the CMC test set provides power supply to the *OSH 256*.

At the moment of power being applied to the *OSH 256*, the Sensor LED will momentarily blink. This also occurs if the *OSH 256* must adjust to a large change in the ambient light.

4 Configuring the Test Universe Software

Energy Meter Testing with OSH 256 and a CMC test set

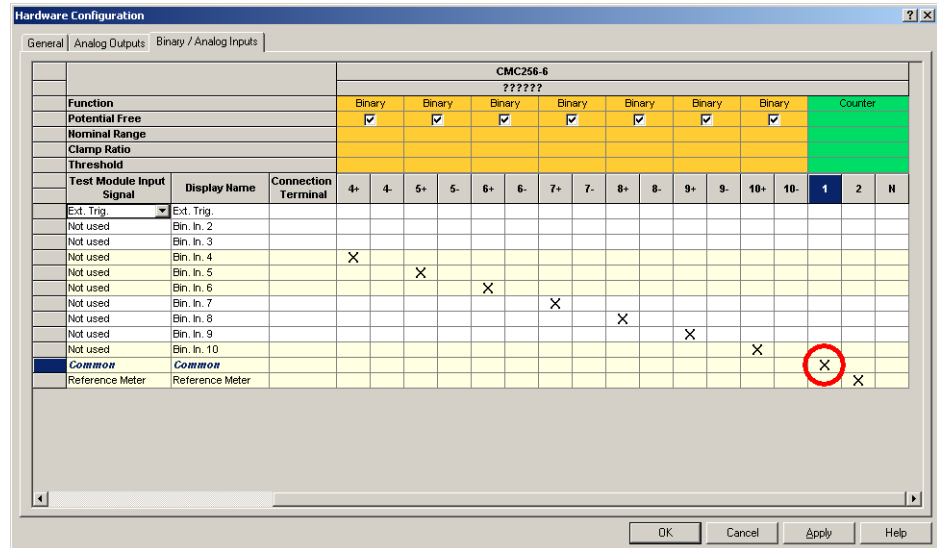
Connect the binary output signal of the *OSH 256* scanning head to the **ext. Interf.** connector at the rear side of the CMC test set by means of the provided adapter cable. Make sure that the *OSH 256* is properly affixed to the energy meter and aligned with the meter's pulse LED.

Then perform the following steps:

- Launch the *Meter* module from the *Test Universe* Start Page or from within an *OMICRON Control Center (OCC)* document.
- Configure the Test Object (click **Parameters | Test Object**).
- Open the Hardware Configuration (click **Parameters | Hardware Configuration**).
- Configure **Analog Outputs** accordingly (three voltages and three currents).
- Select the **Binary/Analog Inputs** window.
- Make sure that the **Counter Input 1** is connected to the Test Module Input Signal **Common** (see figure 4-1).

Click **OK** and continue testing as before.

Figure 4-1:
Configuring *Test Universe* for testing an energy meter via a counter input of a CMC test set



5 Technical Data

The guaranteed values indicated in this chapter apply for one year starting at the date of delivery.

5.1 Internal Power Supply

The *OSH 256* uses an internal +12 V power supply for the detector electronics. This is used to generate an internal +5 V supply.

5.2 Start-up Time

The *OSH 256* is ready for use 1 second after applying power.

5.3 Current Drain

At start-up:

The start-up current drain from the CMC test set's internal +15 V supply is limited to an absolute maximum of 100 mA.

At continuous operation:

The continuous current drain from the CMC test set's internal +15 V supply is typically <40 mA and increases to approximately 60 mA for high pulse rate detection.

5.4 Ambient Light Correction

The ambient light correction circuit has a -3 dB point of 3.3 Hz. Rapid changes in ambient light, for example a photo flash from a camera, can cause the device to skip pulses as it corrects for the new ambient light levels.

5.5 Timing Specifications

5.5.1 Maximum Pulse Rate

The *OSH 256* can detect pulse rates of up to 50 kHz. The detector will yield a saturated output in the event of the pulse "off" time exceeding 30 μ s.

For reduced bandwidth operation, an internal jumper can be configured to perform pulse stretching. This reduces the maximum pulse rate to <4 kHz. This can be useful for testing meters where the optical pulse consists of a burst (typically 8 kHz) of pulses. This feature will mask the burst. It could also prove useful for "noisy" optical signals.

To alter the jumper, ensure the unit is unplugged. Remove the two fixing screws, and remove the bottom cover. Move the jumper to the required position. Replace the cover and fixing screws.

5.5.2 Minimum Pulse Width

Reliable pulse detection is possible for single pulses of a width of $>5 \mu\text{s}$.

5.5.3 Pulse Response Time

The time to detect a single pulse of $\geq 5 \mu\text{s}$ is comprised of a delay time of $2 \mu\text{s}$ followed by a rise time of $2 \mu\text{s}$. The CMC test set will be triggered after total delay of $3.8 \mu\text{s}$.

5.5.4 Pulse Turn-off Time

A single pulse of $5 \mu\text{s}$, applied to the *OSH 256*, will result in an output pulse to the CMC of approximately $28 \mu\text{s}$.

This “pulse stretching” is the limiting factor for the maximum achievable pulse detection rate.

5.6 Environmental Conditions

Table 5-1:
Climate conditions

Climate	
Operating temperature	0 to $+50 \text{ }^\circ\text{C}$ (32 to $+104 \text{ }^\circ\text{F}$)
Storage and transportation	-25 to $+70 \text{ }^\circ\text{C}$ (-13 to $+158 \text{ }^\circ\text{F}$)
Humidity	5 to 95% relative humidity, no condensation
Max. altitude	2000 m (6562 feet)

Table 5-2:
Electromagnetic
compatibility

EMC	
CE conformity	The product adheres to the specifications of the guidelines of the council of the European Community for meeting the requirements of the member states regarding the electromagnetic compatibility (EMC) Directive 2004/108/EC.

Table 5-3:
Fulfilled safety
standards

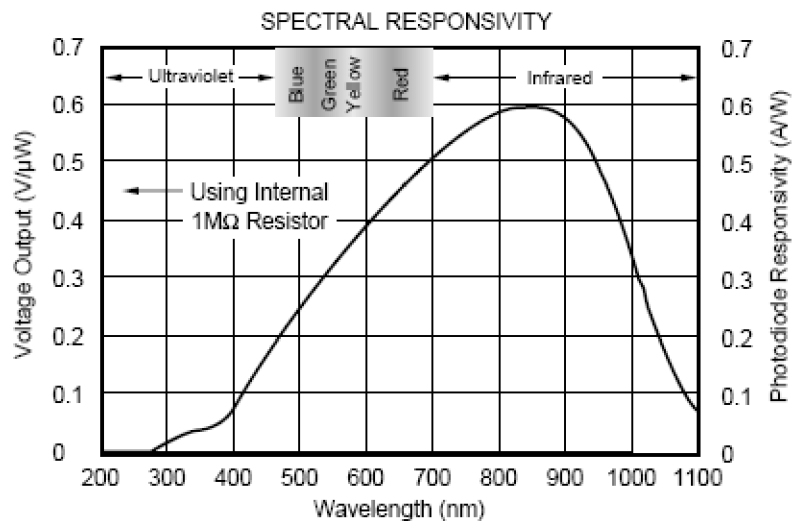
Safety standards	
European standard	EN 61010-1:2001
International standard	IEC 61010-1:2001

5.7 Mechanical Data of OSH 256

Table 5-4:
Mechanical data

Size, weight and protection	
Weight	70 g (0.15 lb)
Dimensions W x H x D	35 x 60 x 25 mm (1.4 x 2.4 x 1.0 inches)
Housing	IP40 according to EN 60529
Cable length	1.7 m (66.9 inches)
Adapter cable	1.0 m (39.4 inches)

5.8 Spectral Responsivity of OSH 256



The preceding plot indicates the expected spectral responsivity vs. wavelength of the monolithic photodiode used by the *OSH 256*. The choice of the 2.3 x 2.3 mm photo diode area results in a high bandwidth detector response.

6 Cleaning

To clean the *OSH 256*, use a cloth dampened with isopropanol alcohol or water.

7 Troubleshooting

In case of problems testing with *OSH 256* or *IFB 256* please observe the following hints. If you still cannot resolve the problem please contact our Technical Support.

Problem	Solution
LED pulses are not correctly read by the CMC: Stray light or light from neighboring indicators interferes with the reading.	Use adhesive rubber compound to shield sensor from unwanted light sources.
LED pulses are not correctly read by the CMC: The light from the pulse LED does not properly meet the sensor lens.	Reposition the <i>OSH 256</i> until the <i>OSH 256</i> Sensor LED shows that the LED pulses are properly recognized. If proper positioning is not possible using the suction cup then use the adhesive rubber compound to fix the <i>OSH 256</i> even to very uneven surfaces at the most appropriate angle.
The suction cup does not stick to the target surface - the <i>OSH 256</i> falls off after a while.	Moisten the suction cup (e.g., with petroleum jelly / vaseline) for better suction action. If this does not help, use the adhesive rubber compound (e.g., placed as a ring around the sensor lens) to fix the <i>OSH 256</i> over the pulse LED.

8 Ordering Information

Table 8-1:
SEM 1 ordering
information

Designation	Ordering no.
<i>SEM 1</i> complete set: <ul style="list-style-type: none"> • <i>OSH 256</i> passive optical scanning head • 1 m adapter cable <i>OSH 256</i> ↔ <i>CMC</i> test set • 1 pack adhesive rubber compound 	VEHZ1158

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