



ZAKŁAD BUDOWY MASZYN DOŚWIADCZALNYCH Sp. z o.o.  
41-708 Ruda Śląska, ul. Pawła 6

**Specification Sheet**  
**Digital Revolution Meter CMO-3**

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# Specification Sheet

## Digital Revolution Meter CMO-3



**Manufacturer:**

Zakład Budowy Maszyn Doświadczalnych [*Experimental Machinery Building Plant*]  
ZBMD® Sp. z o.o.  
41-708 Ruda Śląska  
Ul. Pawła 6



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## **1 General description**

The CMO-3 digital speed indicator is used to measure the rotational speed of centrifugal couplings (triggers) requiring a significantly higher torque to set the centrifugal triggers in motion. The instrument consists of a planetary motor synchronised with the CMI-1 digital pulse counter. It is powered by compressed air, which makes the measuring disc rotate and triggers the centrifugal triggers that are used in the overhead rail braking trolleys, diesel tractors, electric tractors, pneumatic tractors, shunt tractors and drive-braking modules. The CMO-3 digital revolution meter can be used in mine workings endangered by methane and coal dust explosions. The CMI-1 digital pulse meter has received the EC type examination certificate: JSHP 20 ATEX0024X.

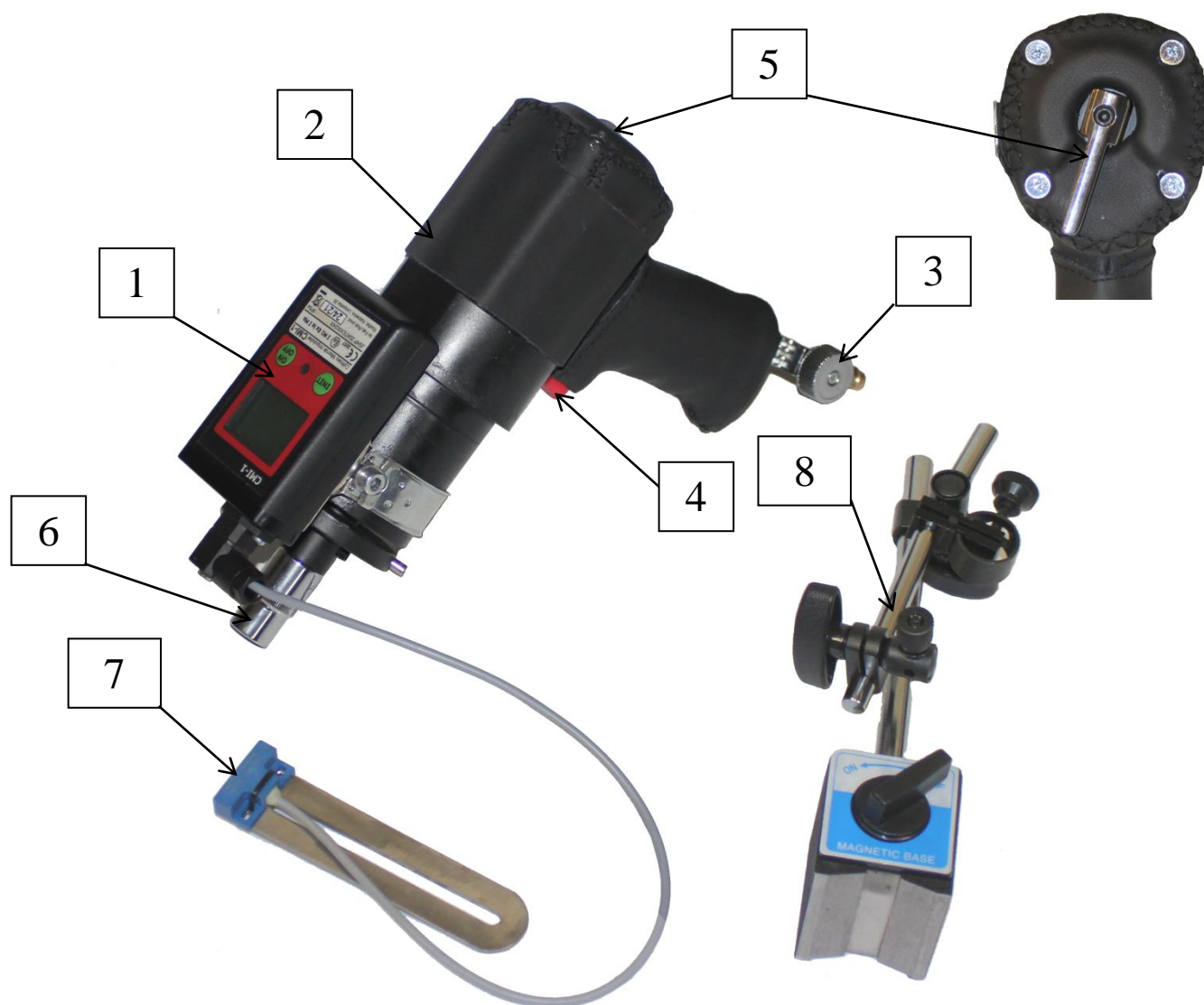
## **2 Operation of the instrument - measuring**

Before measuring, check that the housing is properly attached to the turbine body. Check that the battery has been charged. Connect the magnetic probe connector to the instrument and **attach the measuring head directly to the lever activating the centrifugal trigger so that the lever, after being activated, is outside the magnetic field of the measuring probe head** (fig. 2a and 2b).

Before direct measurement, press the INIT button on the left. Start the turbine by pressing the drain button, and using the control valve knob slowly increase the rpm, which will cause the measuring disc to rotate faster and increase the readings on the device display. The central and lower part of the display shows the result in revolutions per minute (RPM) and the upper part the result in revolutions per second (RPS). When the lever activating the trigger is moved, the measurement in the central part of the display will stop and the measurement in the lower part will continue showing the value of the still rotating measuring disc. **If the magnetic probe is not in contact with a metal mechanical element, pressing INIT will not initiate a new measurement** (fig. 2a and 2b)

**IMPORTANT! The device and pneumatic spanner KP-1 may only be used for measuring speed of centrifugal triggers. It is forbidden to use for drilling, screwing!**

### 3 Design of the Instrument



*Fig.1 CMO-1 digital revolution meter - design*

**LEGEND:**

Digital pulse meter with LCD display.

2. Planetary motor.

3. Control valve.

4. Button to start the turbine.

5. Reversing switch.

6. Crown spanner for example 19mm.

7. Magnetic probe measuring head.

8. Magnetic stand with switch for fixing the magnetic probe measuring head.

Element mechaniczny (dźwignia  
uruchamiająca zadziałanie  
wyzwalacza odśrodkowego)

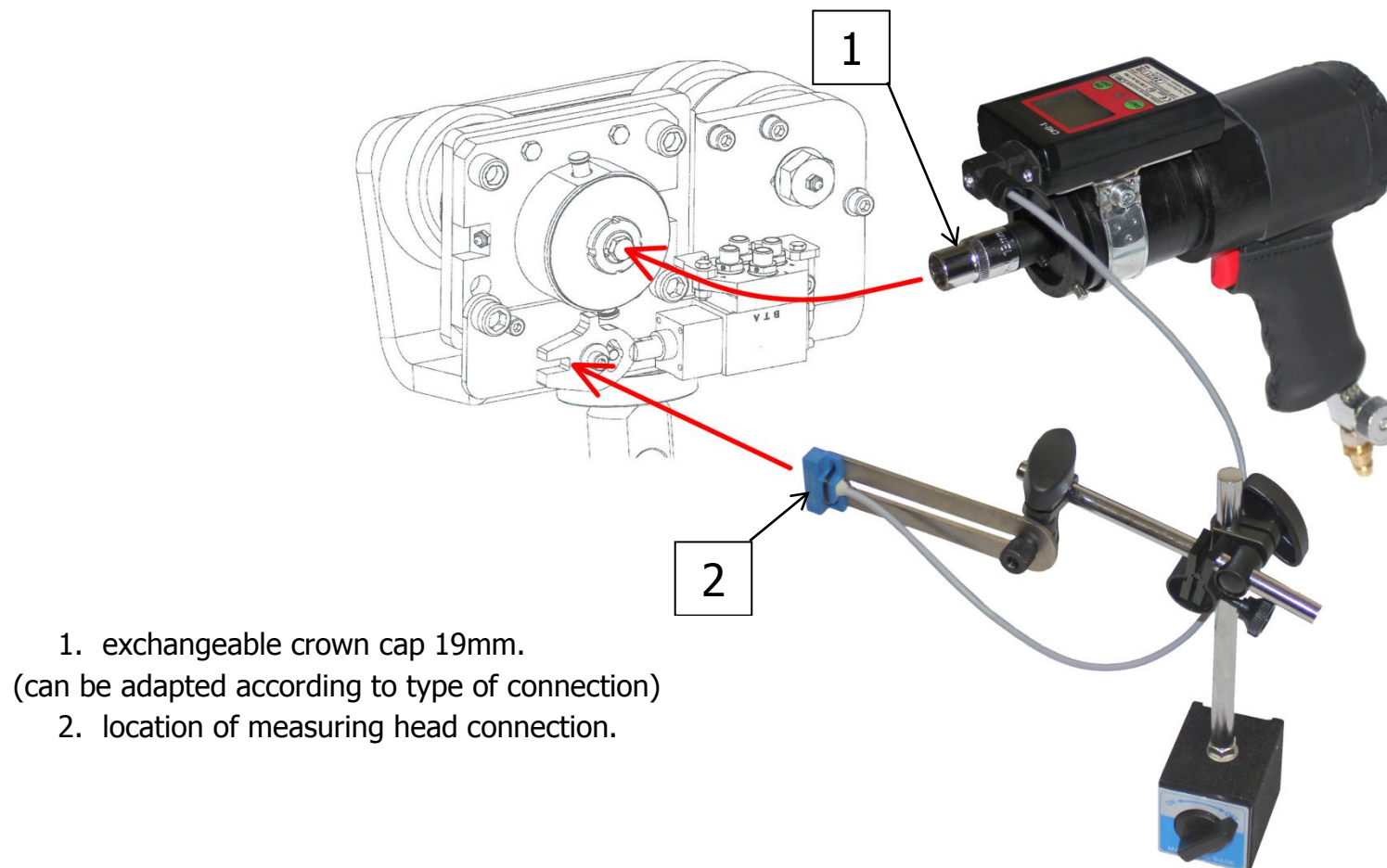


*Fig. 2a. CMO-3 Digital Revolution Meter - magnetic probe positioning in relation to the triggering mechanical element during measurement (head in direct contact with the lever)  
Mechanical element (lever activating the centrifugal trigger)*

Element mechaniczny (dźwignia  
uruchamiająca zadziałanie  
wyzwalacza odśrodkowego)



*Fig. no. 2b. CMO-1 Digital Revolution Meter - position of magnetic probe in relation to the triggering mechanical element after triggering - end of measurement  
(Lever outside the magnetic field).  
Mechanical element- lever activating the centrifugal trigger)*



1. exchangeable crown cap 19mm.  
(can be adapted according to type of connection)
2. location of measuring head connection.

*Fig. no3. . Digital revolution meter CMO-3-example application*



#### 4 Description of display indications

During normal operation the LCD display (fig. 3) shows the measurement of the rotational speed of the rotating element driven by the measuring turbine. In the central part of the display the speed measured in revolutions per minute RPM is indicated, while in the upper part of the display the speed measured in revolutions per second RPS.

The top section indicates the battery charge status.

A magnetic probe is connected to the connector at the top of the device, which controls the pulse counting process.



*Fig 4. View of the LCD display -Digital pulse meter CMI-1*





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## 5 Technical data

### Digital Revolution Meter

Type	CMO-3
EC Type Examination Certificate CMI-1	JSHP 20 ATEX 0024X
KP-1 certificate	KOMAG/21/ZAŚW/0278
Designation	ZBMD-CMO-3-sequential number/year of production
Manufacturer	ZBMD Sp. z o.o.
Max. turbine supply pressure	6,3 bar.
Pneumatic connection of the turbine	1/ 4inch
Max length, min. hose diameter	10 m. fi 8mm
Weight	3 kg
Degree of protection for housing	IP 54
Ambient temperature	-20C <sup>0</sup> to +40C <sup>0</sup>
Relative humidity	up to 96% RH without condensation.
Performance	intrinsically safe
Maximum measured speed	1500 rpm.
Measurement error	0.1 per cent
Automatic switch-off time	after approx. 30 sec.



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## **6 Scope of delivery**

Delivery includes:

- complete CMO-3 revolution meter in a mining bag with the logo of ZBMD<sup>®</sup> or your company,
- warranty card,
- original user's manual / operation and maintenance manual,
- EC type examination certificate ATEX,
- EC/EU declaration of conformity.

## **7 Product ordering**

The CMO-3 digital revolution meter can be ordered from:

Zakład Budowy Maszyn Doświadczalnych Sp. z o.o.

ul. Pawła 6; 41-708 Ruda Śląska

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