

# DIGITAL PROTRACTOR

This instruction describes the operation of the digital protractor. The instruction provides a code of conduct for personnel tasked with the setup, 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. All relevant legal regulations must be observed.

## Operation

The digital protractor features an inclinometer, and it has four magnets on the back and three magnets on the bottom, that can be used to attach the device to suitable surfaces.

## Technical Data

Feature	Value
Dimensions (W x H x D)	50 mm x 50 mm x 39 mm (2" x 2" x 1.5")
Measuring range	±180 degrees
Measuring accuracy	±0,2 degrees

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Operating temperature	+5 °C to +45 °C (41 °F to 113 °F)
Battery	3 V CR2032
Protection class	IP54

## Special Warnings for the Device



### Risk of destruction!

The digital protractor is a precision instrument. Do not drop the device, and also protect it from shocks, extreme temperature fluctuations, direct sunlight, dust, and humidity. Never use the digital protractor on a running engine!



### Risk of wrong measurement results!

If the digital protractor is subjected to shocks or fast, sudden movement, the calibration can be affected and lead to wrong measurement results. In this case, recalibrate the device via the button **ZERO**.

## Switching the Device on and off

The digital protractor is switched on and off via the button **ON/OFF**. If it is not used for five minutes, it shuts down automatically.

### Measuring Angles

1. Place the digital protractor in a reference position. In the reference position, the bottom with the three magnets should be aligned horizontally.
2. To calibrate the digital protractor, push **ZERO**.
  - ▶ If the calibration has been successful,  $0.0^\circ$  is displayed.
  - ▶ If the digital protractor is inclined to one side, the inclination is displayed.

- ▶ From  $0^\circ$  to  $-180^\circ$ , ▼ is displayed next to the value.



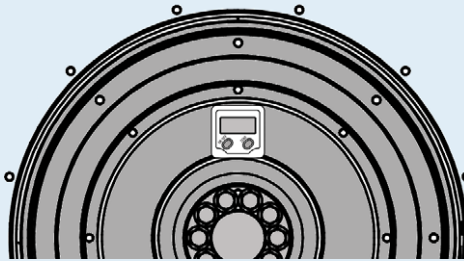
- ▶ From  $0^\circ$  to  $+180^\circ$ , ▲ is displayed next to the value.



### Setting the top dead center of the cylinder

Based on the top dead center (TDC) of the first cylinder in firing order, which on most gas engines is indicated on the flywheel of the crankshaft, all other cylinders can be set to their respective TDC:

1. Use the indicator on the engine to set the flywheel into the position at which the first cylinder in firing order is at its TDC.
2. Use the four magnets on the back to place the digital protractor centrally above the crankshaft on the flywheel.



3. To calibrate the digital protractor, press **ZERO**.
4. Turn the flywheel until the ignition angle between the first and the second cylinder in firing order (see operating manual of the engine) is displayed.
  - ▶ The second cylinder in firing order is at its TDC.

All other cylinders can be set to their respective TDC in the same way.