

# Engine Peak Meter

Type 2516B1/B11

## Cylinder pressure measuring instrument for gas and diesel engines

The Engine Peak Meter Type 2516B... is a rugged measuring instrument for monitoring engines with a speed of up to 4 000 min<sup>-1</sup>. The software for data evaluation contained in the included accessories allows changes in peak pressure to be shown graphically and recorded.

- Immediate on-site data evaluation
- Rechargeable battery
- Software for data evaluation included
- Easy to operate

### Description

The battery-operated measuring instrument measures between 1 and 100 pressure cycles from which it calculates the arithmetic average values of the peak pressure, standard deviation, maximum gradient of the pressure curve as well as the average pressure curve. The numeric data are shown on the LC display and can be saved as required. The average pressure curve plotted can be analyzed with the software for data evaluation contained in the included accessories. Since long indicator pipe cause gas oscillations which falsify the measuring signal, the cylinder pressure signal can be smoothed with an adjustable low-pass filter. The measurement data can be stored in two areas of the memory, each of which holds 20 records ("As found"/"As left"). This enhanced functionality makes the new engine peak meter ideal for balancing the cylinders of gas and diesel engines.

An additional measuring function allows the peak pressure to be displayed without time limitation and sending the analog sensor signal at the monitor output.

### Application

For indicator valve measurements, the sensor Type 6613CP is preferably installed and fitted in adapter Type 6513A. This very precise sensor has proved to be ideal in industrial applications. The sensor Type 6613CP is contained in the measuring set (in a case) Type 2516B11.



### Technical Data

Measuring range		
Type 2516B1	bar	0 ... 250
Input voltage range		
Type 2516B1	V	1 ... 15
Sensor sensitivity (adjustable)	mV/bar	7 ... 40
Accuracy of the pressure value display	%	≤±0,5
Resolution	bar	0,1
Range of engine speed	min <sup>-1</sup>	50 ... 4 000
Operating temperature range	°C	0 ... 50
Number of pressure cycles (adjustable)	–	1 ... 100
Low-pass filter (5th order Butterworth)	Hz	300, 500, 1 500, 5 000
Number of data memories		2
Memory capacity per memory	Data record <sup>1)</sup>	20
Sampling rate per revolution	–	720
LCD graphic display	Dots	128x64
Monitor output	–	BNC neg.
Output (Monitor)	V	5
USB interface	–	2,0
Dimensions Type 2516B1	mm	183x92x45
Dimensions Type 2516B11 (case)	mm	452x327x100
Weight	g	350
Battery rechargeable	NiMh	9V, 250m/Ah
Life expectancy	h	>4
Charging time	h	<4

<sup>1)</sup> A data record consists of numerical measurands, curve trace, number, date and time of the memory location

2516B\_000-941e-04..18

**Measuring functions**

- $p_{max}$  Maximum peak pressure
- $p_{min}$  Minimum peak pressure
- $p_{av}$  Average peak pressure
- $S_{dev}$  Standard deviation of the peak pressure
- $dp/ca$  Maximum gradient of the pressure curve
- r/min Speed
- $p_{peak}$  Current peak-pressure; measuring function unlimited in time

**Auxiliary function**

- $p_{av}$  Average cylinder peak pressure value  $p_{av}$  of the engine  
This value is calculated from  $p_{av}$  stored in the memory block 1. The calculated value is displayed and instantly updated as new data is entered.

**Pressure curve**

Average pressure curve with a resolution of 720 measuring points per revolution, which can be printed out via the USB interface (ASCII file).

**Software**

These pressure curves can be displayed graphically by means of Windows Software contained in the included accessories. The pressure curves of all cylinders can be overlapped – a feature for verifying the cylinder balancing of the engine.

**Auxiliary functions**

Setting of all measuring parameters with keyboard via LCD menu.

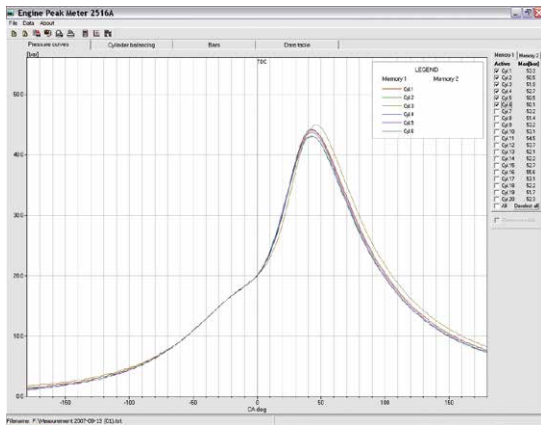


Fig. 1: Cylinder pressure curves of a 6-cylinder gas engine, before and after the maintenance work ("as found"/"as left")



Fig. 3: Cylinder peak pressure deviation  $p_{av}$  of each individual cylinder compared to the calculated average peak pressure of the engine, before and after the maintenance work ("as found"/"as left")

Memory 1	Area [mm²]	Perim [mm]	Vol [mm³]	AVG CA [°]	AVG P [bar]	AVG F [1/rev]	Memory 2	Area [mm²]	Perim [mm]	Vol [mm³]	AVG CA [°]	AVG P [bar]	AVG F [1/rev]
GA1	51.1	32.8	45.1	4.33-25.8	1.8	1007	GA1	51.4	32.4	44.1	3.73-25.1	1.8	1005
GA2	50.5	30.2	44.1	3.73-25.8	1.8	1007	GA2	51.7	30.5	45.8	3.73-25.1	1.8	1001
GA3	51.1	31.1	45.5	3.33-25.8	1.8	1006	GA3	54.0	30.7	45.7	4.33-25.1	2.0	1006
GA4	52.7	34.0	45.4	4.53-25.8	1.8	1006	GA4	50.8	31.8	45.1	3.33-25.1	1.8	1003
GA5	50.5	30.8	44.7	3.43-25.8	1.6	1005	GA5	51.7	30.1	45.7	3.63-25.1	2.0	1005
GA6	50.1	30.5	44.1	3.43-25.8	1.6	1005	GA6	52.7	31.4	45.0	4.13-25.1	2.0	1005

Fig. 2: Data table with the numeric values, before and after the maintenance work ("as found"/"as left")



Fig. 4: Bar diagram

2516B\_000-941e-04\_18

**Ordering Code and Accessories Included**      **Type/Art.No.**

**Engine Peak Meter Type 2516B1**  
(without sensor and measuring set in case)

- Software for data evaluation      7.642.025

**Engine Peak Meter Type 2516B11**  
(with sensor and measuring set in case)

- Cylinder pressure sensor with Piezotron amplifier      6613CP
- Adapter for connection to indicator valve      6513A
- Special spanner wrench      1300A1
- Software for data evaluation      7.642.025
- Battery charger      5.510.293
- Case      3.070.219



Fig. 5: Scope of delivery Type 2516B11

**Description Type 6613CP**

Life time optimized sensor for engine diagnostics and monitoring of diesel- and gas engines.

- Small thermal shock
- Long life time
- Robust design



Fig. 6: Sensor Type 6613CP

**Technical Data**

Range	bar	0 ... 250
Overload	bar	300
Sensitivity ±10 %	mV/bar	20
Normal frequency	kHz	≈90
Linearity, all ranges	%FSO	≤±1
Operating temperature range		
Front part of sensor	°C	-50 ... 350
Hex-nut to connector	°C	-50 ... 150
Electronics in the plug	°C	-50 ... 90
Time constant at 350 °C	s	>10
Connector		Type Fischer SE 103 pos.

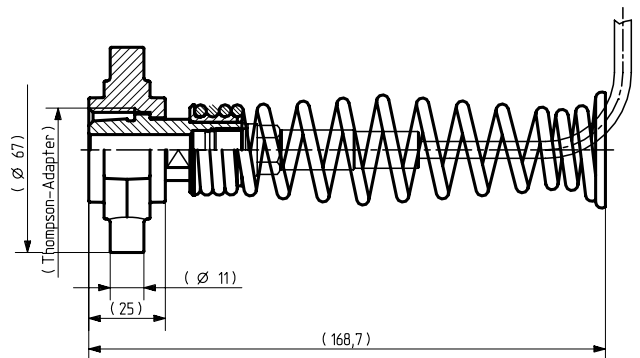


Fig. 7: Sensor mounting in Thompson-Adapter Type 6513A

Further technical data and information see data sheet Dok. No. 6613CP\_000-895.

Windows is a registered trademark of Microsoft Corporation.

2516B\_000-941e-04.18