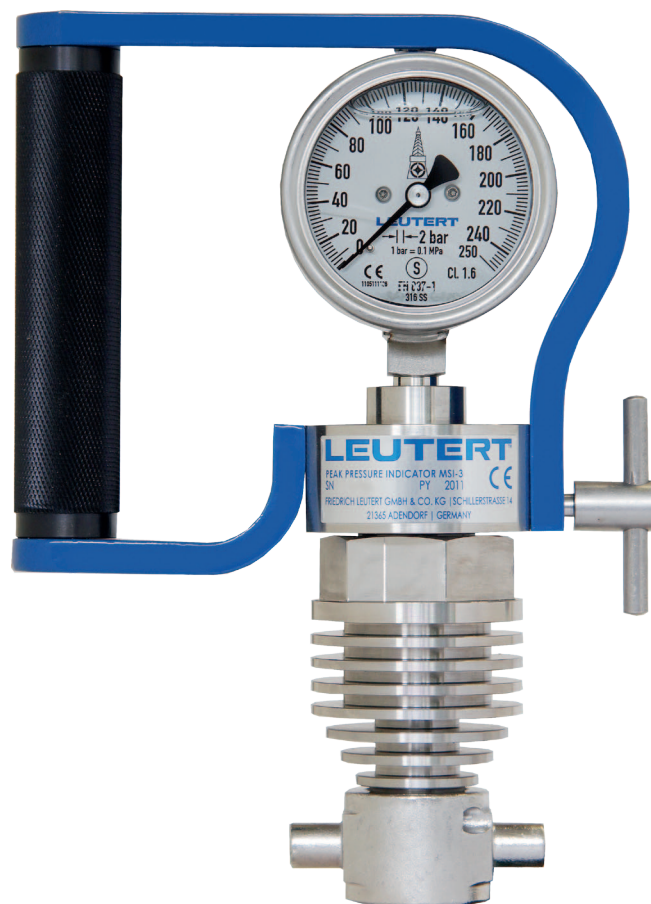


Peak Pressure Indicator MSI-3

Operating Instructions



Engine Indicator

The MSI-3 peak pressure engine indicator is designed for displaying the maximum value of gas pressures which are subject to constant and rapid variations. The device is particularly suitable for applicational tasks on Diesel engines.

Introduction

This operating manual provides instructions on how to use this product correctly, effectively and safely for the intended purpose. Please, do read all instructions, notes on danger and warning, attentively. Please follow all safety instructions and precautionary notes in order to avoid damage to people or property during operation. LEUTERT can not be held responsible for damage or injury resulting from improper product use, incorrect operation or lack of maintenance.

This operating manual is directed mainly at technically trained personnel. In case of doubt regarding safety or operational aspects, please do not hesitate to contact LEUTERT for assistance. Should you notice a faulty description or depiction or if you would like to suggest points for improvement, we are looking forward to hearing from you.

Please keep the operating manual near the product to have it available if needed. Make sure that the manual is protected from dirt and moisture.

Explanation of symbols:



DANGER

Immediate danger is possible causing severe injury or death if you do not follow the instructions given.



WARNING

If you do not heed the warning, dangerous situations may occur leading to severe injury or death.



CAUTION

Follow the instructions carefully, otherwise dangerous situations may occur leading to injury or damage to property.



NOTICE

Please follow the recommendations and instructions for a correct and flawless operation of the device or measuring system.

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1 The Peak Pressure Indicator

1.1 General Description

The LEUTERT peak pressure indicator MSI-3 is designed for displaying the maximum value of gas pressures which are subject to constant and rapid variations. The device is particularly suitable for applicational tasks on Diesel engines.

The MSI-3 consists of a sturdy grip section as well as a solid stainless- steel bottom part with connecting nut and venting screw. The display unit, a stainless steel pressure gauge, is mounted on the top end of the bottom part. The bottom part also houses a shock absorber and a shutoff system. The shock absorber regulates and stabilizes the buildup of pressure for the display unit. The shutoff system closes as soon as the peak pressure is reached and, thus, enables you to obtain a correct pressure reading. The venting screw may be actuated to reset the device to its zero position after the measuring procedure has been completed.

The MSI-3 is hallmarked by simple operation and a high degree of instrumental precision in all speed ranges. Its sturdy design makes it immune to vibration, with extremely low maintenance requirements.

The connecting nut enables the MSI-3 unit to be mounted on any indicator valve or cock with a standard W27 x 1/10" thread.

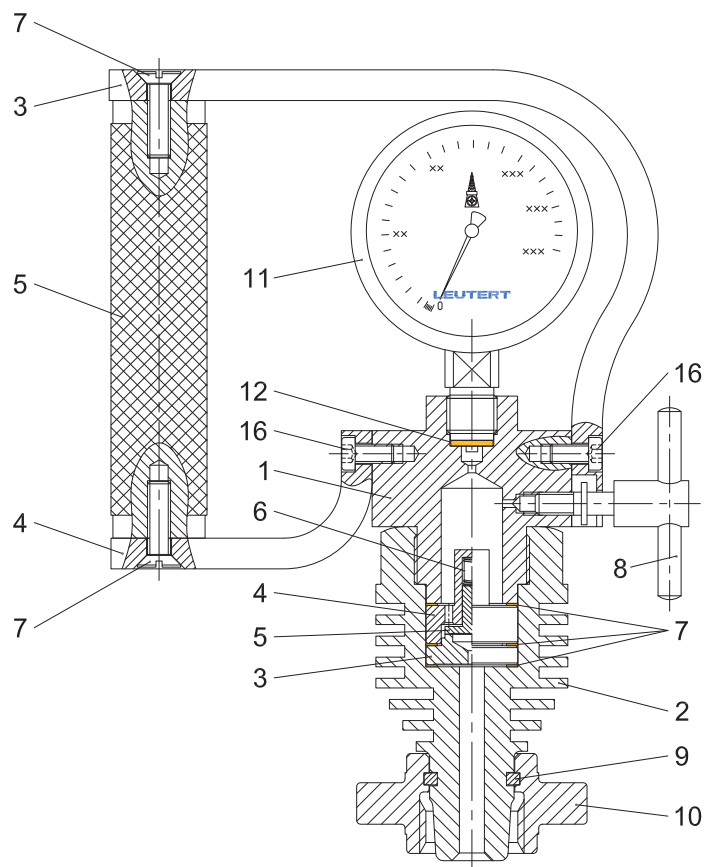
1.2 Technical Specifications

Measuring ranges	:	0–160 bar, 0–250 bar
Engine range	:	up to 2,500 rpm
Error margin	:	± 1.6 %
Dimensions	:	210 mm x 155 mm x 60 mm
Weight	:	1.9 kg without wooden box 3.2 kg with wooden box

2 Assembly Drawing and Inventory

2.1 The Indicator

Item	Description	Part-No.
1	Upper part	4645.11.00001
2	Bottom part	4645.11.00002
3	Valve base plate	4645.11.00003
4	Valve guide	4645.11.00004
5	Indicator valve (stem + spindle)	4645.11.00005
6	Pressure spring	4645.11.00006
7	Copper seal	9000.00.89123
8	Venting screw	4645.11.00008
9	Holding ring	4651.11.03102
10	Connecting nut	4651.11.03103
11	Pressure gauge 0–160 bar	9000.00.91307
	Pressure gauge 0–250 bar	9000.00.91308
12	Profile washer for pressure gauge	9000.00.89122
13	Bracket, large	4645.11.00009
14	Bracket, small	4645.11.00010
15	Grip	4645.11.00011
16	Hexagonal screw	ISCHRBM05.055
17	Countersunk screw	SSCHRBM06.110



2.2 Tools and Accessories

Item	Description	Part-No.
18	Wooden box	4645.11.00013
19	Hollow spanner	4651.98.00002
20	Test protocol	4645.11.00014
21	Measuring log pad	4645.11.00015
22	Operating instructions	4645.11.00017
23	Ball-point pen	9000.00.37461



3 Operating Procedure

Make sure that the indicator to be used is designed for the correct engine pressure.



WARNING

Check the maximum pressure of the indicator. If the pressure gauge is designed for lower pressures the indicator will be damaged.

Close the venting screw on the indicator.



WARNING

Put on suitable gloves as the instrument will get very hot during operation.

The use of safety glasses is required when operating the indicator as hot gas and particles may be ejected from the engine.

Blow out the indicator valve before mounting the indicator to remove possible condensed water, oil or soot deposits which could result in wrong indication of engine pressure.



DANGER

The valve ejects hot gas under high pressure. Danger of sparks and burns!

Close the indicator valve.

Mount the indicator onto the indicator valve.



WARNING

Use only the hollow spanner provided to attach or remove the indicator from the indicator valve. Hammering on the extensions of the connecting nut will damage the nut. As a result the nut might brake apart and detach itself and owing to the presence of high pressure severe injury or death may result.

The indicator should be mounted preferably close to the engine cylinder to be tested. If necessary the indicator connections can be placed at the side of the engine cylinder leaving the indicator in a horizontal position. However this will not effect the correct function of the indicator. In some cases extension tubes are required to attach the indicator.

Open the indicator valve fully.



CAUTION

Whenever the indicator valve is open, the venting screw must remain in closed position and must not be opened.

After a measuring period of approximately 10 seconds, peak pressure readings may be taken.

Close the indicator valve.



CAUTION

Detach the indicator immediately from the indicator valve to prevent any unnecessary buildup of heat in the instrument.

Enter the readings into the measuring log.

Open the venting screw to reset the device to zero.

Store the indicator when not in use with the venting screw open in order to allow condensation to escape. This procedure takes a couple of hours.

4 Maintenance

The MSI-3 was designed such that it can be used without virtually any need for intensive maintenance. The pressurized parts are manufactured from corrosion-resistant material and require no further care.

When using the MSI-3, take care that no particles of soot enter the instrument. After every period of use, the tapered connection on the bottom part should be cleaned.

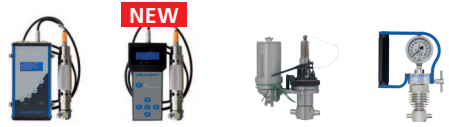
If the upper part is disconnected from the bottom part, the copper seals need to be replaced. The same applies if the pressure gauge has been disconnected.

It must be ensured that even after prolonged periods of use correct measurement data can be obtained. The instrument should therefore be returned to the LEUTERT factory or authorized service center for testing and re-calibration every two years.

LEUTERT's latest innovation

Digital Pressure Indicator DPI^{Type50} **NEW**

The Digital Pressure Indicator DPI^{Type50} can be seen as the electronic equivalent of our range of mechanical indicators with all advantages of an electronic device and a very convincing price-performance ratio.



Indicator / Features	DPI-2	DPI ^{Type50}	Type 50/30	MSI-3
Automatic power/MIP calculation with CAE	✓	–	–	–
Software based power/MIP calculation without CAE ¹⁾	✓ ²⁾	✓ ²⁾	✓ ³⁾	–
Analyzing Software	✓	✓	–	–
Fuel injection measurements	✓	–	–	–
Electronic data transfer and sharing	✓	✓	–	–
P-Max	✓	✓	✓	✓
PV-Plot	✓	✓	✓	–
P-comp	✓	✓	✓	–
DP (Derivative plot)	✓	✓	–	–
RPM	✓	✓	–	–
Suitable for 2- and 4-stroke engines	✓	✓	✓ ⁴⁾	✓

- 1) Less accurate than using calculation with CAE sensor
- 2) After manual TDC correction in the software
- 3) Using Planimeter with manual calculation, and engines fitted with an indicator drum drive
- 4) Choose correct indicator type according to RPM range

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