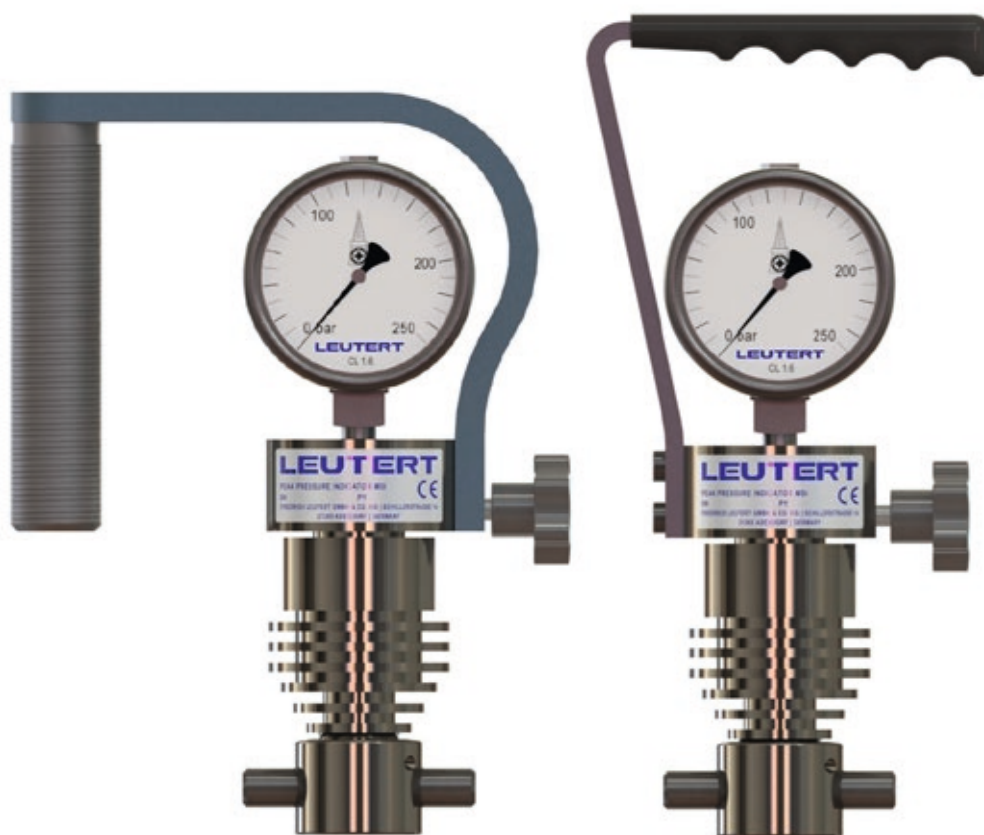


OCTOBER 2023

Peak Pressure Indicator MSI

Operating Instructions



Engine Indicator

The Leutert Peak Pressure Indicator MSI measures and displays maximum compression or ignition pressures in individual cylinders of large two- or four-stroke engines.

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Introduction

This operating manual provides instructions on how to use this product correctly, effectively and safely for the intended purpose. Please 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 to 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

indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

indicates a hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



NOTICE

is used to address practices not related to personal injury.

1 Description of the MSI-3

The MSI-3 peak pressure indicator measures the maximum cylinder pressure of large two- and four-stroke engines. It features a shock absorber integrated into a stainless steel body, a union nut, a pressure gauge and a handle, all safely stored in an instrument case.

The peak pressure indicator is attached to the engine via an indicator valve with the union nut. The indicator valve is part of the engine. When the indicator valve is opened, the pressure in the combustion chamber is routed to the pressure gauge via the shock absorber. The shock absorber reduces vibration and slows down the pressure drop once the pressure in the combustion chamber decreases, therefore the maximum pressure can easily be read on the pressure gauge. Each cylinder of the engine is measured individually.

The Leutert peak pressure indicator MSI-3 is designed to withstand the high pressures and temperatures generated in modern internal combustion engines such as marine diesel and gas engines. Its robust design makes it insensitive to vibrations and requires very little maintenance. This engine indicator is characterized by simple operation and high instrumental precision in all speed ranges.

For smaller engines with limited installation space, we recommend the peak pressure gauge MSI-4.

Technical Specifications

Max. peak pressures	20 MPa, 25, MPa, 160 bar, 250 bar, 300 bar (others upon request)
Engine range	up to 2,500 rpm
Permissible temperature	ambient -20 to 60°C
Error margin	± 1.6 %
Dimensions c/w box	38 x 29 x 10 cm
Weight	1.8 kg without box, 2.6 kg with box
Standard connection	W 27 x 1/10"

2 Assembly Drawing and Inventory of MSI-3

Item	Description	Part-No.
Peak Pressure Indicator MSI-3		
	MSI-3 20 MPa	4641.00.00000
	MSI-3 25 MPa	4642.00.00000
	MSI-3 160 bar	4644.00.00000
	MSI-3 250 bar	4645.00.00000
	MSI-3 300 bar	4646.00.00000



Item	Description	Part-No.
Tools and Accessories		
16	Hollow spanner	4651.98.00002
17	Test protocol	VD-MF-8510-05
18	Operating instructions	4645.11.00017

Item	Description	Part-No.
Components		
1	Upper part	4645.11.00001
2	Bottom part assembly	4645.11.00018
3	Shock absorber assembly	4645.99.01000
3a	Spring	4645.11.00006
3b	Ball	4645.11.00005
3c	Shock absorber base	4645.11.00003
3d	Filter	4645.11.00019
4	Copper seal	9000.00.89123
5	Bleed screw	4645.11.00008
6	Pressure gauge 0 – 160 bar	9000.00.91307
	Pressure gauge 0 – 250 bar	9000.00.91308
	Pressure gauge 0 – 300 bar	9000.00.91309
	Pressure gauge 0 – 20 MPa	9000.00.91304
7	Pressure gauge seal	9000.00.89122
8	Bracket	4645.11.00009
9	Handle	4645.11.00011
10	Hexagonal screw	ISCHRBM05.055
11	Countersunk screw	SSCHRBM06.110



3 Description of the MSI-4

The MSI-4 peak pressure gauge is used to measure the ignition pressure of large combustion engines. It is attached to the engine via an indicator valve using a union nut. In contradiction to the peak pressure indicator MSI-3 the peak pressure gauge MSI-4 was designed for smaller 4-stroke engines with limited space for installation of an indicator such as auxiliary marine diesel and locomotive engines.

The MSI-4 peak pressure gauge features a shock absorber integrated in a stainless steel body, a union nut, a pressure gauge, and a handle, all securely stored in an instrumentation box. The indicator valve is part of the engine. When the indicator valve is opened the pressure inside the combustion chamber is lead to the pressure gauge via the shock absorber. The shock absorber reduces vibration and slows down the pressure drop once the pressure in the combustion chamber decreases, therefore the maximum pressure can easily be read on the pressure gauge. Each cylinder of the engine is measured individually.

The MSI-4 peak pressure gauge is designed to resist the high pressures and temperatures generated in modern combustion engines. Its sturdy design makes it immune to vibrations and requires extremely low maintenance. This engine indicator, sometimes called peak pressure gauge, is hallmarked by simple operation and a high degree of instrumental precision in all engine speed ranges.

Technical Specifications

Max. peak pressures	25 MPa, 300 bar (others upon request)
Engine range	up to 2,500 rpm
Permissible temperature	ambient -20 to 60°C
Error margin	± 1.6 %
Dimensions c/w box	38 x 29 x 10 cm
Weight	1.6 kg without box, 2.4 kg with box
Standard connection	W 27 x 1/10"

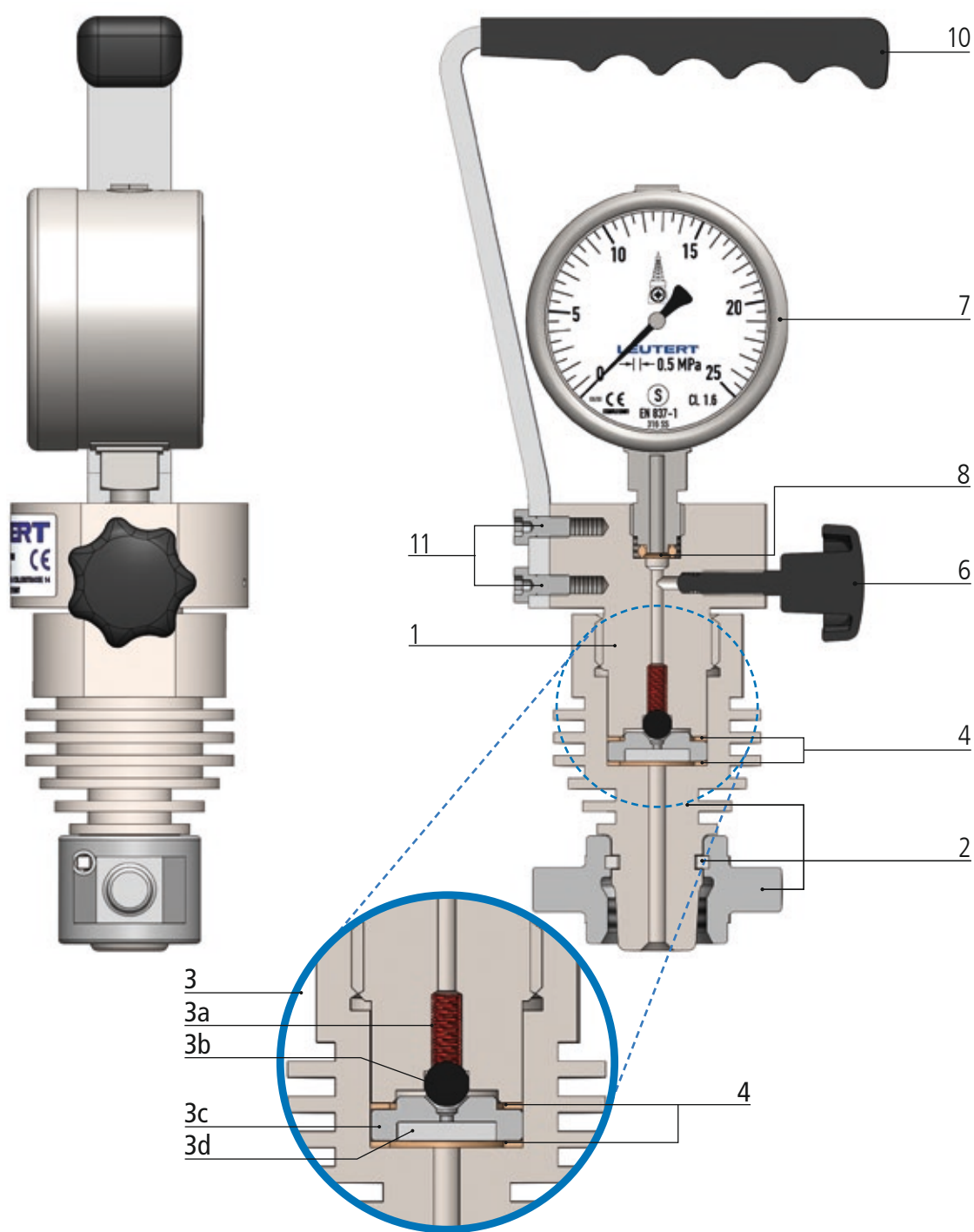
4 Assembly Drawing and Inventory of MSI-4

Item	Description	Part-No.
Peak Pressure Gauge MSI-4		
	MSI-4, 25 MPa	102369
	MSI-4, 300 bar	4646.20.00000



Item	Description	Part-No.
Tools and Accessories		
12	Hollow spanner	4651.98.00002
13	Test protocol	VD-MF-8510-05
14	Operating instructions	4645.11.00017

Item	Description	Part-No.
Components		
1	Upper part	102371
2	Bottom part assembly	4645.11.00018
3	Shock absorber assembly	4645.99.01000
3a	Spring	4645.11.00006
3b	Ball	4645.11.00005
3c	Shock absorber base	4645.11.00003
3d	Filter	4645.11.00003
4	Copper seal	9000.00.89123
6	Bleed screw	4645.11.00008
7	Pressure gauge 0 – 25 MPa	102376
7	Pressure gauge 0 - 300 bar	9000.00.91309
8	Pressure gauge seal	9000.00.8912200
10	Handle	102379
11	Hexagonal screw	ISCHRBM05.055



5 Operating Procedure



WARNING

Check the maximum operating pressure of the indicator.



WARNING

Put on gloves as the MSI 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.

Open the indicator valve and blow it through before mounting the indicator to remove 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!



NOTICE

The indicator valve is the valve permanently attached to each cylinder of an engine. It must not be mistaken for the bleed valve which is part of the MSI.



Close the indicator valve.

Mount the indicator on the indicator valve.

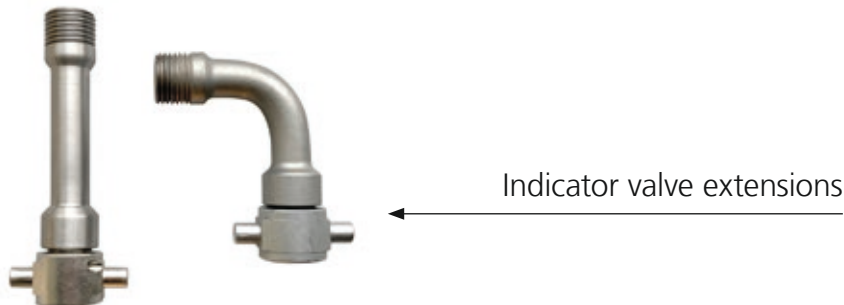


WARNING

Exclusively use hollow spanner provided to attach or remove indicator from 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 MSI should be mounted as close as possible to the cylinder head of the engine.

Possibly the gauge ports are located on the side of the engine cylinder with the gauge remaining in a horizontal position. This does not affect the function and accuracy of the engine indicator. Despite this, it is sometimes more convenient to connect the gauge to the engine cylinder using an extension tube.



Close the bleed screw on the indicator.



CAUTION

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

Open the indicator valve fully.

After a measuring period of approximately 5 seconds, peak pressure readings may be taken.



NOTICE

The indicator valve must be kept open while reading the maximum indicated pressure from the MSI's pressure gauge.

Close the indicator valve and after a maximum testing period of 30 seconds and disconnect the peak pressure indicator from the engine.



WARNING

The peak pressure indicator must not get hotter than 60°C. Detach the indicator immediately from the indicator valve to prevent any unnecessary buildup of heat in the indicator. After approximately 20 measurements allow the indicator to cool down for 10 to 15 minutes.

Close the indicator valve.

Open the bleed screw to reset the device to zero.

The next cylinder may be measured following the procedure described above.



NOTICE

Store the indicator when not in use with the bleed screw open in order to allow condensation to escape, which may take a couple of hours.

6 Maintenance

The MSI was designed to 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, take care that no particles of soot enter the peak pressure indicator. After every period of use, the tapered connection on the bottom part should be cleaned.

If excessive soot has entered the MSI over time, the internal shock absorber may require service. To do this, the indicator handle must be removed from the indicator and the upper part separated from the lower part. The shock absorber assembly can now be removed, cleaned or replaced.

Please note that whenever the top part has been separated from the bottom part of the indicator, the copper seals need to be replaced. Upper and bottom part need to be tightened to a torque of 150 Nm. 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 MSI should therefore be returned to the LEUTERT factory or authorized service center for testing and re-calibration every two years.



NOTICE

Only use compressed air or nitrogen gas to test the peak pressure indicator. Using oil to test the indicator will cause damage.

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– Original edition, manuals in other languages on request –



EC-Declaration of Conformity

The Manufacturer

Friedrich Leutert GmbH & Co. KG
Schillerstrasse 14, 21365 Adendorf, Germany

declares that the following product:

Product	Peak Pressure Indicator MSI-3	Peak Pressure Indicator MSI-4
Max. working pressure	160 bar Part-No. 4644.00.00000 250 bar Part-No. 4645.00.00000 300 bar Part-No. 4646.00.00000 20 MPa Part-No. 4641.00.00000 25 MPa Part-No. 4642.00.00000 300 bar Part-No. 4646.20.00000 25 MPa Part-No. 102369	
Permissible temperature	ambient -20 to 60°C	

meets the regulations of the following directives including their alterations being valid at the time of this declarations:

☒ **Machinery Directive 2006/42/EG**

☒ **Pressure Equipment Directive 2014/68/EU (PED), Modul A**

SEBASTIAN LEUTERT



Adendorf, 19.10.2023

place,date

Representative of executive management for declarations of conformity