

PMI SYSTEM
Pressure Analyser



PMI System
Pressure
Analyser

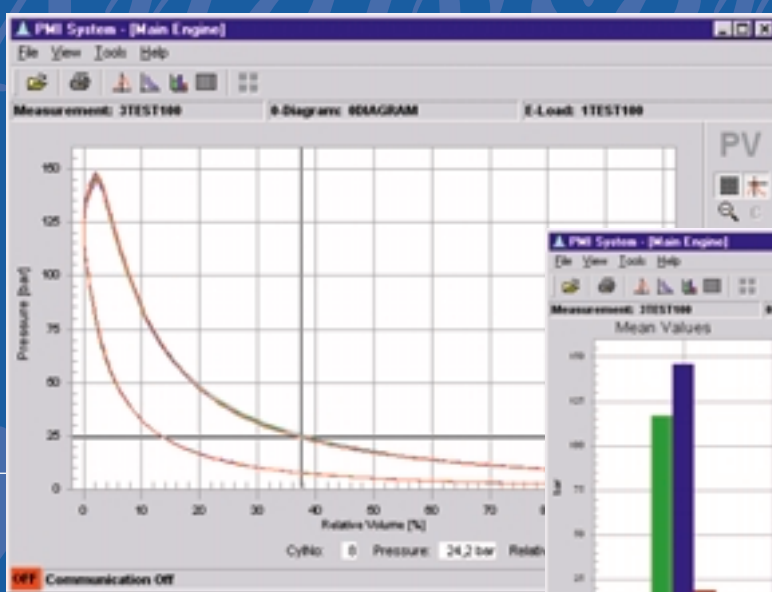


The PMI System ...

- **User friendly Cylinder Pressure Analyser...**
One-person operated tool with easy-to-use user-interface. Takes less than 15 minutes to collect and display a complete set of measurements.
- **Reliable and precise measurement of cylinder pressure...** Uses a high performance piezo-electric pressure transducer and an advanced crank angle trigger system for determining the TDC of each cylinder.
- **Direct display of engine performance data...** Cylinder pressure data presented as easy-to-interpret measurement curves. Engine performance is calculated and displayed in tabular form.
- **Assists in optimising engine performance...** Indicates the max. pressure deviation of each cylinder and computes index settings for balanced output from all cylinders.
- **No time consuming planimetering of diagrams...** Replaces the traditional mechanical indicator.



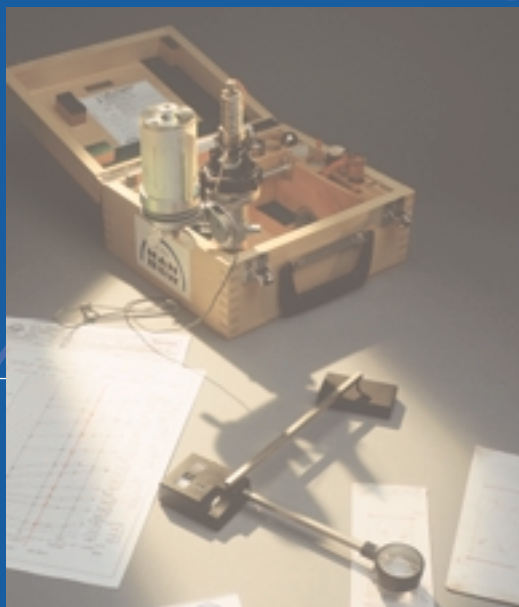
Cylinder Pressure Measuring



Work Diagram



Balance Plot



Planimeter

Application and Features

The PMI System is a user-friendly computerised tool for reliable and precise performance evaluation on two and four stroke diesel engines in both single and multi-engine plants. The system replaces the traditional mechanical indicator, and hence no planimetry or manual calculation is required.

Reliable calculation of mean indicated cylinder pressure and other performance data requires accurate measurement of cylinder pressures and detection of crankshaft position.

The PMI System uses a high performance piezo-electric pressure transducer of well proven design and can automatically identify which cylinders are measured.

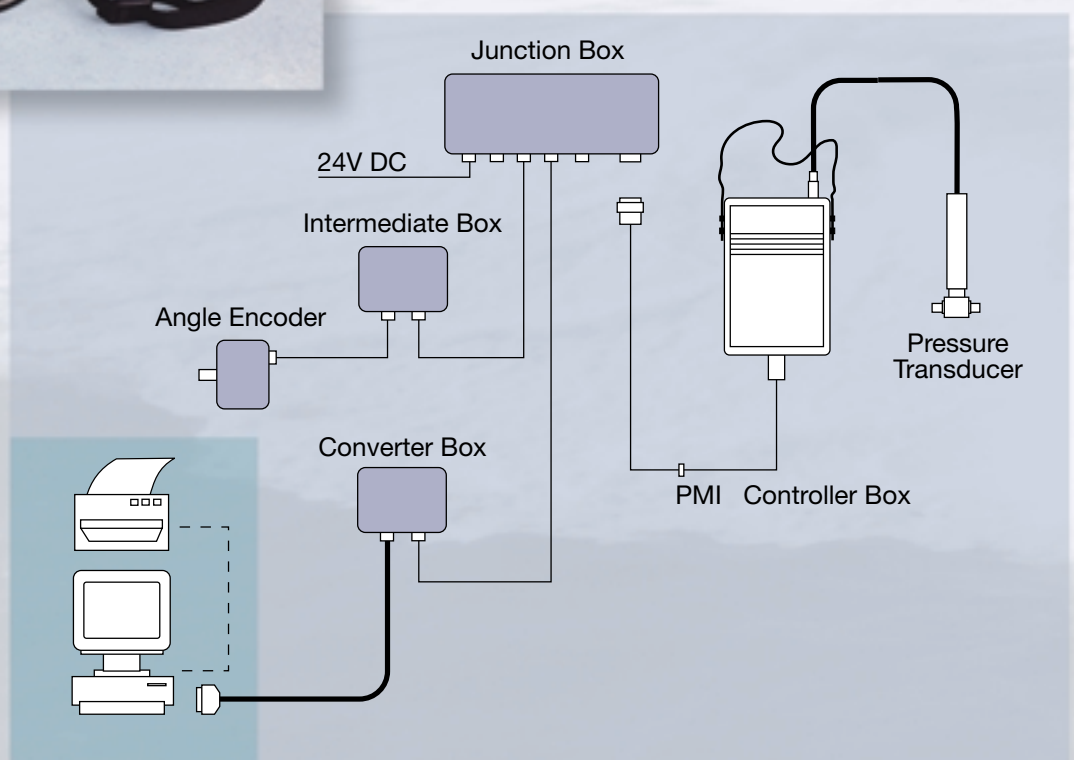
The pressure transducer is mounted on the cylinder head indicator cock for measurements and then moved from one cylinder to another in order to complete measurements on all cylinders. It is therefore only exposed to the harsh environment of the combustion chamber for a very short time.

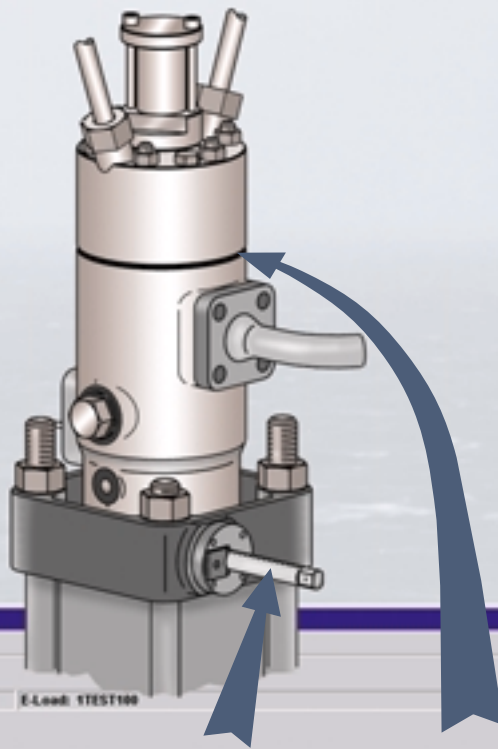
A unique feature of the PMI System is that it compensates for the twisting experienced by each section of the crankshaft due to the torque generated under different loads.

For detecting the crankshaft position a number of alternative pickups are available. For example, depending on the engine layout either an angle encoder or a light emitting pickup may be fitted. These generate a continuous train of electrical pulses which are used to trigger the PMI System in accordance with the rotation of the crankshaft.

The trigger pulses and pressure transducer/PMI controller signal are transmitted via cable to a junction box which is permanently mounted on the engine.

Both the controller and junction box include the communication interfaces necessary to collect the measurement data and automatically transfer it to a PC where it is stored in the database of the system for subsequent calculation and display.





PMI System - [Main Engine]

File View Tools Help

Measurement: 3TEST100 9-Diagram: 8DIAGRAM E-Load: 1TEST100

Cylinder Number	p(i) [bar]	p(comp) [bar]	p(max) [bar]	Engine Speed [rpm]	Effective Power [kW]	Effective Power [bhp]	p(i) Deviation [bar]	Index Adjust [H]	Rotation of Link [H]	p(max) Deviation [bar]	Shim Adjust [H]
1	19,00	116,4	145,2	210,5	631	858	-0,01			-0,4	
2	18,88	116,5	144,2	209,8	624	849	-0,13			-1,3	
3	18,89	116,8	146,8	209,8	625	850	-0,12			1,2	
4	19,53	117,1	146,9	209,8	647	880	0,52	-1,4	-0,6	1,3	
5	18,65	116,3	143,7	209,8	616	838	-0,36			-1,9	
6	19,14	117,7	147,4	209,8	634	862	0,13			1,8	
7	18,74	116,1	146,2	210,5	622	845	-0,27			0,7	
8	18,98	116,8	142,8	209,8	628	854	-0,03			-2,7	
9	19,28	116,8	146,7	209,8	639	868	0,27			1,2	
Mean	19,01	116,7	145,5	210,0	630	856					
Total					5666	7704					
	p(scav)	2,65 bar									

VT

Communication Off

Value Table

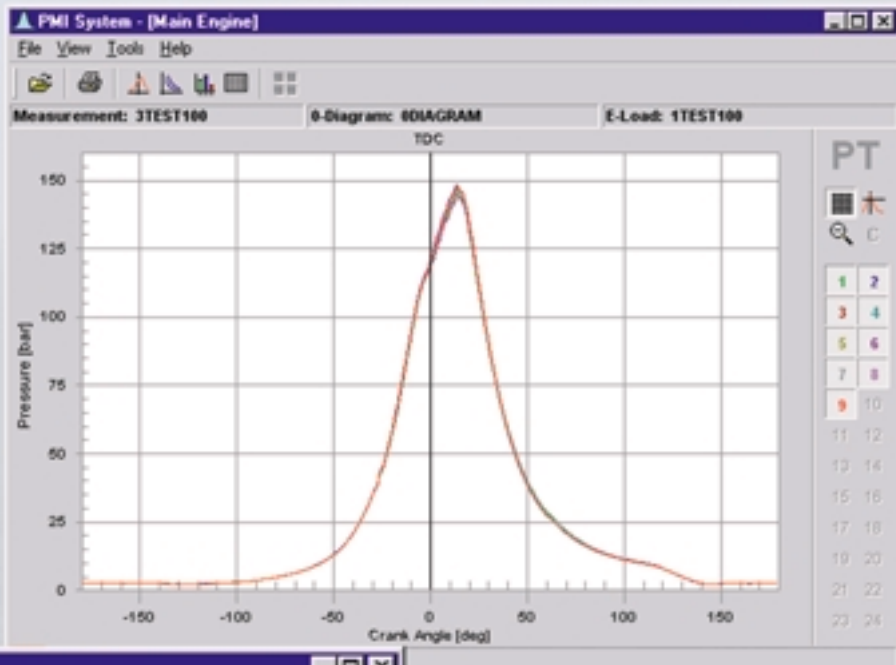
Results & Evaluation

Once measurements have been stored in the PMI database they can be instantly viewed on the PC and printed.

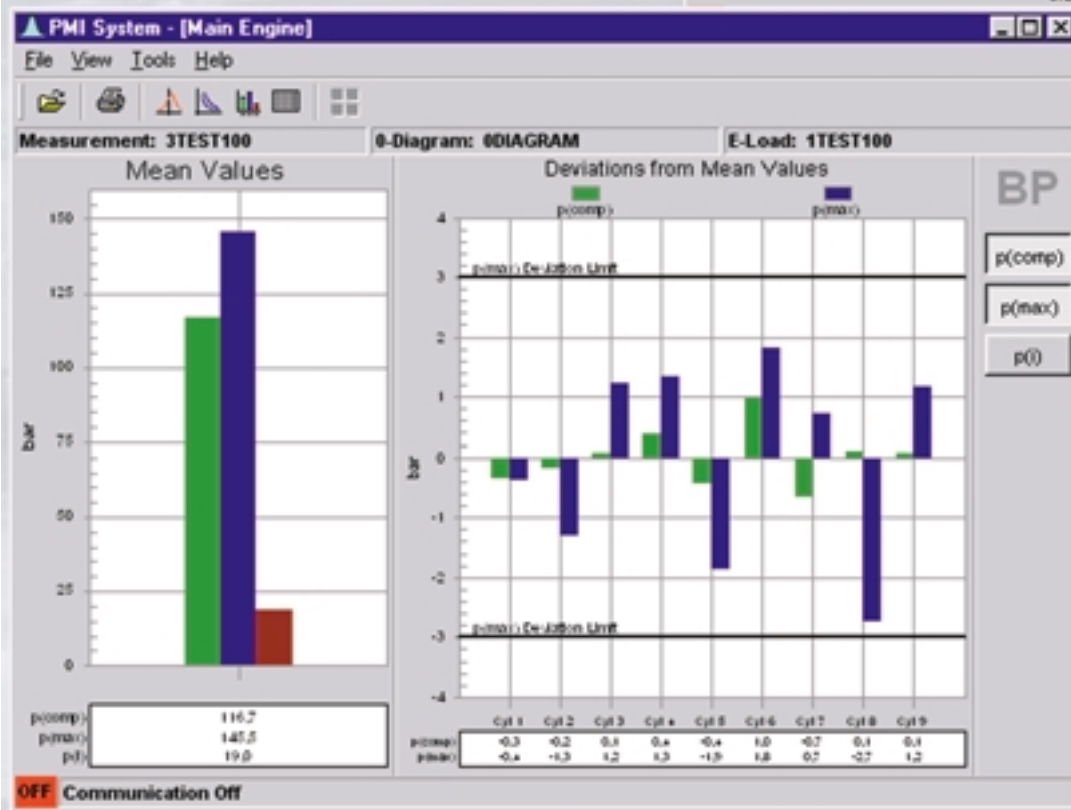
Cylinder pressure and work diagrams (i.e. PT and PV diagrams) can be displayed for one or a selected number of cylinders at the same time. The diagrams are used for assessing engine performance.

The PMI System generates proposals for adjusting the mean indicated and maximum pressure of each cylinder of two stroke engines. These are based on comparing the current measurement with the pressure deviation limits defined by the engine maker or user.

The results are presented in tabular form and show how much the fuel pump 'index' of the cylinders must be adjusted to achieve a properly balanced engine without further readjustment.



Cylinder Pressure Diagram



Balance Plot

In addition, values are given for the compression pressure, maximum pressure, mean indicated pressure and scavenge air pressure, as well as the engine speed and engine output for each cylinder and the engine as a whole.

The PMI System can directly export measurement data to the CoCoS-EDS Engine Diagnostics System which is also available from MAN B&W Diesel, and thus expands the engine measurement, analysis and diagnostic capabilities of CoCoS-EDS.

Scope of Supply

The PMI System comprises the following:

Carrying Case containing:

- 1 x Pressure Transducer with integral coupling for cylinder cock and output connector for PMI Controller
- 1 x PMI Controller with shoulder strap and cable for Junction Box
- Installation and User Guides (English language)
- Data CD containing PMI software

Other items included:

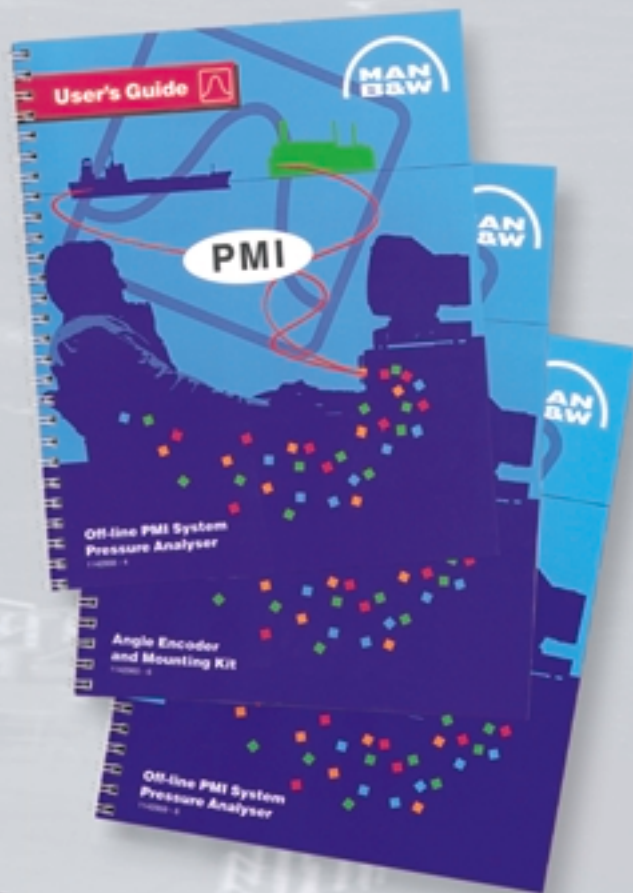
- 1 x Crankshaft Pickup, plus Mounting Kit, per engine
- 1 x Junction Box per engine
- 1 x Intermediate Box per engine
- 1 x Converter Box (RS422 - RS232) for coupling PMI System to free communication port of PC

Computer Requirements

- Pentium II Processor, or later
- 32 MB RAM or more
- Hard disk with 500 MB free space, or more
- SVGA video adaptor with 640 x 480 resolution or better
- CD-ROM drive
- Mouse
- Free Communication Port

Operating System

Microsoft® Windows NT (v. 3.5.1 or later),
Windows 95™ or later





MAN B&W Diesel A/S

Teglholmmsgade 41
DK-2450 Copenhagen SV
Telephone: +45 33 85 11 00
Telex: 16592 manbw dk
Telefax: +45 33 85 10 30
E-mail: manbw@manbw.dk
www.manbw.dk



MAN B&W Diesel A/S Alpha Diesel

Niels Juels Vej 15
DK-9900 Frederikshavn
Telephone: +45 96 20 41 00
Telex: 67115 alpha dk
Telefax: +45 96 20 40 30
E-mail: alpha@manbw.dk



MAN B&W Diesel A/S Holeby Diesel

Østervej 2
DK-4960 Holeby
Telephone: +45 54 69 31 00
Telex: 40646 hodiell dk
40280 hodiell dk
Telefax: +45 54 69 30 30
E-mail: holeby@manbw.dk

Copyright ©
MAN B&W Diesel A/S
Reproduction permitted
provided source is given

MAN B&W Diesel A/S
CVR No.: 39 66 13 14
P367 - 00.04

