

MAHLE

EmissionPRO® Emission Control Line



MAHLE EmissionPRO®

The EmissionPRO® line fits all your needs for emission testing. It includes gas analysers and opacimeters for monitoring the exhaust system of petrol/diesel engined cars and also motorcycles. These devices do far more than standard measuring tools and are ideal for official inspections and tests on the composition of emissions. They comply with applicable national regulations.

Maximum efficiency for minimal environmental impact

Exhaust gas analysers

Exhaust gas analysers from MAHLE are designed for measuring the different exhaust gas concentrations in all engine types. They can be used for monitoring emissions in legally required inspections, for routine automotive servicing and also for repair.

Opacimeters

Our opacimeters for diesel engines are small and compact. Equipped with a 12 V power supply, the units are user friendly for workshops and also for mobile applications.

RPM counter

The universal RPM counter for petrol and diesel engines transfers its real-time data values to the tester via Bluetooth or USB. RPM's and temperature are acquired from the device's standard sensors. Optionally, the device can collect vehicle RPM and temperature data using the OBD connector (EOBD-300 EVO wireless connector).

Modular and flexible: Our EmissionPRO® Line

- Modularity: you can configure your personal station by choosing MAHLE instruments, and connect them easily to the PC station
- Open system: compatible with all common commercial software and hardware systems
- Plug and play solution: we completely pre-configure and test all our exhaust examination testers
- Highest measuring accuracy
- Approved by several national regulations (in continuous development)



EmissionPRO®

BMU690



Advantages at a glance

- The RPM counter is incorporated via an induction clamp, capacitive clamp or optional wireless module RMU300 (via bluetooth)
- Connection to a PC can be Serial, USB or Bluetooth (BT-100)

The BMU690 analyses the gas from the exhaust pipe using the probe. By using the specified EmissionPRO® software, users benefit from every feature of the analyser. In addition, the user can easily switch from routine measurements to a legally specified test. Using high-precision technology, the BMU690 analyses the absorption of the different elements CO, CO₂ and HC, and thereby determines their concentrations. Optionally Oxygen and NO_x concentrations can be measured via electrochemical sensors.

The condensate separator assembly is precision-molded to minimise the gas path and shorten maintenance times. The separation filter has two parts: a mesh filter and a coalescing filter. The design enables the continuous exit of condensate forming in the separator via a single-shaft and twin-head pump. In addition to the gas and air inlet for the autozero phase, the BMU690 also features a special inlet for calibrating from a gas sample cylinder.

Measuring fields			
CO	0 ÷ 9,99	% vol	Res. 0.01
CO ₂	0 ÷ 19,9	% vol	Res. 0.1
HC hexane	0 ÷ 9,999	ppm vol	Res. 1
O ₂	0 ÷ 25	% vol	Res. 0.01
NO _x	0 ÷ 5,000	ppm vol	Res. 1
Lambda	0.5 ÷ 5		Res. 0.001
Revolutions Inductance/capacitance	300 ÷ 9,990	rpm	Res. 10
Oil temperature	20 ÷ 150	°C	Res. 1

Type-approval for Europe

- M Metrology Marking: MID (Measuring Instrument Directive) 2014/32/EU NMI 0122 B+D

Additional National Type-Approvals

- Italy, Morocco

EmissionPRO[®]

BMU688



Advantages at a glance

- The RPM counter is incorporated via an induction clamp, capacitive clamp or optional wireless module RMU300 (via bluetooth)
- Connection to a PC can be Serial, USB or Bluetooth (BT-100)
- The BMU688 enables connection to the opacimeter via the OMNIBUS port. In this case, the analyser converts into a smoke density meter for diesel engines.

The flexible BMU688 gas analyser can operate easily in a workshop location and also function as a independent mobile device. Emissions are sampled at the exhaust pipe using the specially designed probe. With the intuitive interface users can easily switch between modes, i.e. from independent measurements to a legally specified test. The BMU688 features six backlit LCD displays, clearly showing the readings of ongoing tests. When analysis is complete, the user can directly print out the test results or optional send them to a connected computer. The integrated condensate separator is designed to prevent an obstacle

in the gas flow and reduces maintenance costs. Its special design facilitates the continuous drainage of condensate that forms in the separator. The separation filter has two parts: a net filter and a coalescing filter. In addition to the gas and air inlet for the autozero phase, the BMU688 also features a special inlet for calibration using a gas sample cylinder.

The rear side of the unit has connections for the power supply, for RPM and temperature probes, which can either in wired or wireless mode communicate to the PC.

Measuring fields

CO	0 ÷ 9,99	% vol	Res. 0.01
CO ₂	0 ÷ 19,9	% vol	Res. 0.1
HC hexane	0 ÷ 9,999	ppm vol	Res. 1
O ₂	0 ÷ 25	% vol	Res. 0.01
NO _x	0 ÷ 5,000	ppm vol	Res. 1
Lambda	0.5 ÷ 5		Res. 0.001
Revolutions Inductance/capacitance	300 ÷ 9,990	rpm	Res. 10
Oil temperature	20 ÷ 150	°C	Res. 1

Type-approval for Europe

- M Metrology Marking: MID (Measuring Instrument Directive) 2014/32/EU NMI 0122 B+D

Additional National Type-Approvals

- Brazil, Hong Kong, Italy, Morocco, Serbia

EmissionPRO® BMU200



Advantages at a glance

- Automatic diagnostics: The program analyses the gas values and provides a list of individual readings.
- Double lambda sensor test: With its oscilloscope feature, the unit analyses variations in the signal and calculates an operating efficiency value.
- Cylinder head leak test: The program guides the user through the test and, by analysing the gases in the coolant expansion tank, is able to determine whether the cylinder head gasket is leaking or not.

The BMU200 exhaust gas analyser can be connected to a PC via serial port. The unit communicates automatically with the test vehicle for collecting and saving the required test data e.g. temperature and speed. With its minimal dimensions, this unit is ideal for mobile use and to integrate in your existing station. Provided with proprietary MAHLE software running on a PC, it allows various diagnostic operations that help the operator in evaluating the vehicle's exhaust gas.

Gas curve

The unit automatically records the gas readings at different engine speeds and plots the data in a chart. This chart can be used as a gas curve. It's the perfect equipment for road tests and workshop testing.

Catalytic converter efficiency

The program guides the user through the test and calculates the efficiency of the catalytic converter for the different types of gas in percent – both pre and post the catalytic converter.

Measuring fields

CO	0 ÷ 9,99	% vol	Res. 0.01
CO ₂	0 ÷ 19,9	% vol	Res. 0.1
HC hexane	0 ÷ 9,999	ppm vol	Res. 1
O ₂	0 ÷ 25	% vol	Res. 0.01
NO _x	0 ÷ 5,000	ppm vol	Res. 1
Lambda	0.5 ÷ 5		Res. 0.001
Revolutions Inductance/capacitance	300 ÷ 9,990	rpm	Res. 10
Oil temperature	20 ÷ 150	°C	Res. 1

Type-approval for Europe

- M Metrology Marking: MID (Measuring Instrument Directive) 2014/32/EU NMI 0122 B+D

Additional National Type-Approvals

- Austria, Colombia, Czech Rep., Germany, Hungary, Italy, Peru, UK

EmissionPRO[®]

RMU300



Advantages at a glance

- Neural Network Technology: easily identifies and isolate noise, which could affect the accuracy of the measurement.
- Extreme measurement precision

The RMU300 is MAHLE's universal RPM counter that transmits engine RPM and temperature to the receiver via Bluetooth. RMU300 records the rotation frequency based on harmonics of the engine, according to battery charging signal or via a magnetic vibration sensor, and the engine temperature via the standard temperature sensor. The built-in rechargeable battery eliminates the previous need of the old RPM counter's for cables to connect to the car battery. The user-friendly software provides comprehensive, clearly organised information of the signal quality, current readings, and transmission quality of the signals to the receiver. Using the optional EOBD-300 EVO the engine speed can also be recorded via OBD interface via Bluetooth.

The RMU300 can be connected to a PC via a USB cable (included) or via Bluetooth.

The SG-030 (specified for motorcycles) records RPM using phono-metric measurements. Due to highly precision it can also be used in particularly complicated situations (ex. for trucks).

Signal recording options:

1. Vibration sensor
2. Alternator harmonics
3. EOBD connector (EOBD-300 EVO) for speed and temperature.

Measuring fields			
RPM	300 ÷ 9,990	rpm	Res. 10
Temperature	20 ÷ 200	°C	Res. 1

Certifications

- Dekra
- Ministero Trasporti Italia

EmissionPRO®

DMU300



Advantages at a glance

- Open system: compatible with all common commercial software and hardware systems
- Plug and play solution: we fully pre-configure all our exhaust examination testers. Ready to use.

The DMU300 is designed for flexibility and ease of use and can be connected to a PC via serial interface. The user-friendly MAHLE software guides even untrained users safely and intuitively through the emission testing process.

Like many other devices in this series, the DMU300 opacimeter can also be incorporated in various MAHLE emission control configurations, enabling users to

set up a testing station based on their individual requirements.

It can also be integrated in existing stations (on a MAHLE trolley for example), and therefore fits harmoniously and stylistically in workshops that use MAHLE equipment.

Measuring fields

Light transmission	0 ÷ 99,9	%	Res. 0.1
Light transmission	0 ÷ 9,99	m ⁻¹	Res. 0.01
Rev counter	300 ÷ 9,990	RPM heat.	Res. 10
Oil temperature	20 ÷ 150	°C	Res. 1
Smoke temperature	20 ÷ 400	°C	Res. 1

Compliance

- ISO 11614 Standards

National Type-Approvals

- Bulgaria, France, Italy, Morocco, Netherlands, Romania, Serbia

EmissionPRO® DMU100



Advantages at a glance

- Guaranteed modularity: Designed to integrate in your customized testing station. This ensures flexibility and meets your specific needs.
- Extreme measurement precision.

Small and compact: Thanks to its small dimensions, 12V power supply and comfortable ergonomic handle, the DMU100 is ideal for mobile use. The opacimeter can be connected to a PC via serial port.

The measuring device has an integrated heated measuring chamber with a length of 20 millimeters. The unit tests according to the reference method, whereby a second opacified glass is used as a

measurement reference.

The exhaust probe includes additional adapters for passenger cars and trucks.

With the specially developed MAHLE software, you can use the DMU100 to work with all brands and models.

Measuring fields

Light transmission	0 ÷ 99,9	%	Res. 0.1
Light transmission	0 ÷ 9,99	m ⁻¹	Res. 0.01
Rev counter	300 ÷ 9,990	RPM heat.	Res. 10
Oil temperature	20 ÷ 150	°C	Res. 1
Smoke temperature	20 ÷ 400	°C	Res. 1

Compliance

- ISO 11614 Standards

National Type-Approvals

- Austria, Brazil, Bulgaria, Colombia, Czech Rep., Germany, Hong Kong, Hungary, Italy, Netherlands, Peru, Portugal, Romania, Spain, UK

MAHLE Emission Control Configurations

➤ Not all configurations and devices are available in all markets.



BMU200 Exhaust gas analyser

Code: 1030500064xx

RMU300 Rev counter

Code: 1030400040xx



BMU688 Exhaust gas analyser

Code: 1030400073xx

RMU300 Rev counter

Code: 1030400040xx



BMU690 Exhaust gas analyser

Code: 1030500074xx

RMU300 Rev counter

Code: 1030400040xx



DMU100 Opacimeter

Code: 1030400029xx

RMU300 Rev counter

Code: 1030400040xx



DMU300 Opacimeter

Code: 1030400036xx

RMU300 Rev counter

Code: 1030400040xx



EmissionPRO® Mobile

Special for AU 5.1 | Germany MARKET

**DMU100 | BMU200 | RMU300
VCI100 | PC**



EmissionPRO® 180

Special for AU 5.1
Germany MARKET

- DMU100
- BMU200
- RMU300
- PSI 50
- TRO-220 Trolley XL
- VCI100 OBD Scantool
- Personal Computer
- Monitor 24"
- Printer
- Mouse



EmissionPRO® 150

Special for AU 5.1
Germany MARKET

- DMU100
- BMU200
- RMU300
- PSI 50
- TRO-060 Trolley L
- VCI100 OBD Scantool



EmissionPRO® Configuration A

- BMU688
- DMU100
- RMU300
- PSI 51
- TRO-060



EmissionPRO® Configuration B

- BMU200
- DMU100
- RMU300
- PSI 50
- TRO-060



EmissionPRO® Configuration C

- BMU688
- DMU300
- RMU300
- PSI 51
- TRO-060



EmissionPRO® Configuration D

- BMU690
- DMU300
- RMU300
- PSI 51
- TRO-060

Overview

Exhaust Gas Analyser	BMU690	BMU688	BMU200
Measuring chamber	Amb2 sensors	Amb2 sensors	Amb2 sensors
Gas sampling	4 L/min.	4 L/min.	4 L/min.
Condensate drain	Automatic and continuous	Automatic and continuous	Automatic and continuous
Leak test	Semi-automated	Semi-automated	Semi-automated
Minimum flow check	Automatic	Automatic	Automatic
Checks sensor for remaining O ₂	Automatic (< 5mv)	Automatic (< 5mv)	Automatic (< 5mv)
Protective filters of measurement heads for water/gas from pump	Attached externally to prevent the unit from opening and the seal from being lost	Attached externally to prevent the unit from opening and the seal from being lost	Internal
Automatic ambient pressure compensation	850 ± 1060 Kpa	850 ± 1060 Kpa	850 ± 1060 Kpa
Calibration	With gas sample cylinder	With gas sample cylinder	With gas sample cylinder
Zero position	Automatic	Automatic	Automatic
Time for heating to 20 °C	10 Minutes	10 Minutes	10 Minutes
Response time for CO, CO ₂ and HC	< 10 Seconds	< 10 Seconds	< 10 Seconds
Response time for O ₂	< 60 Seconds	< 60 Seconds	< 60 Seconds
Printer	No	Integrated thermal printer with 24 columns	No
Display	No	6 LCD units	No
Connections	Rpm measurement via cable for inductance or capacitance clamp	Rpm measurement via cable for inductance or capacitance clamp	Rpm measurement via cable for inductance or capacitance clamp
	Oil inlet temperature from Pt100 sensor (Din 43760)	Oil inlet temperature from Pt100 sensor (Din 43760)	Oil inlet temperature from Pt100 sensor (Din 43760)
	Rpm/oil temperature received via RS-232 cable, wireless frequency 433 MHz (optional)	Rpm/oil temperature received via RS-232 cable, wireless frequency 433 MHz (optional)	Rpm/oil temperature received via RS-232 cable, wireless frequency 433 MHz
	Serial ports: PC USB B (slave mode); PC RS-232 (9600,N,8,1); PC in RS-485 network (9600,8,N,1) Software programming/updates via RS-232 cable	Serial ports: PC USB B (slave mode); PC RS-232 (9600,N,8,1); PC in RS-485 network (9600,8,N,1) Software programming/updates via RS-232 cable User interface to DMU100 opacimeter possible	Serial ports: in RS-485 network Software programming/updates via RS-232 cable
Power supply	12 V DC typical (11–15 V DC)	12 V DC typical (11–15 V DC)	12 V DC typical (11–15 V DC)
Consumption	1.5 A DC	1.5 A DC	1.5 A DC
Operating temperature	5 ± 40 °C	5 ± 40 °C	5 ± 40 °C
Dimensions	360 x 280 x 288 mm	434 x 190 x 291 mm	220 x 140 x 430 mm
Weight	5 kg	5 kg	5 kg

Opacimeters	DMU100	DMU300
Light source	With green Led diode	With green Led diode
Light receptor	Photodiode	Photodiode
Measuring chamber pressure monitoring	Automatic	Automatic
Stabilisation of measuring chamber temperature at 90 °C	Yes	Yes
Monitoring of glass cover cleaning system	Automatic	Automatic
Zero position	Automatic	Automatic
Time for heating to 20 °C	10 Minutes	10 Minutes
Receives rpm and temperature	Via cable or wireless device	Via cable or wireless device
Connections	Serial port RS-232 Serial port in RS-485 network	Serial port RS-232 Serial port in RS-485 network
Power supply	12 V DC typical (11–15 V DC)	12 V DC typical (11–15 V DC)
Consumption	1 A DC, 5 A DC with heater switched on	1 A DC, 5 A DC with heater switched on
Operating temperature	0 ÷ 40 °C	0 ÷ 40 °C
Dimensions	360 X 280 x 288 mm	200 x 140 x 430 mm
Weight	5 kg	5 kg

RPM Counter	RMU300
Display	LCD 3.5", 320 x 240 mm, 700 Nit (cd/m²)
Keypad	Soft touch keypad
Battery	Lithium-ion, rechargeable
Interfaces	USB 2.0 Bluetooth
Dimensions	200 X 100 x 30 mm
Weight	0,385 kg

Opacimeters	BMU690	BMU688	BMU200	DMU300	DMU100	RMU300
1010750038XX TRO-060 Trolley	■	■	■	■	■	■
1010700025XX OMNI-010 Cable Communication/Power Supply 0.4 M			■	■	■	
1010700065XX OMNI-011 Cable Communication/Power Supply 0.75 M			■	■	■	
1010700028XX OMNI-030 Cable Communication/Power Supply 6 M			■	■	■	
1010700135XX OMNI-050 Cable Communication/Power Supply 2 M	■	■				
1010700136XX OMNI-060 Cable Communication/Power Supply 6 M	■	■				
1010500001XX NOx-010 sensor for AGS	■	■	■			
1030700029XX EOBD-300 EVO						■
1010700165XX SG-030 RPM Motorcycle Probe						■
1010601163XX BT-100 USB Kit Bluetooth Module	■	■	■	■	■	■
1010601410XX BT-100 Bluetooth Module	■	■	■	■	■	





MAHLE - We shape future mobility

MAHLE

EmissionPRO®

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