DYNTEST AML-S

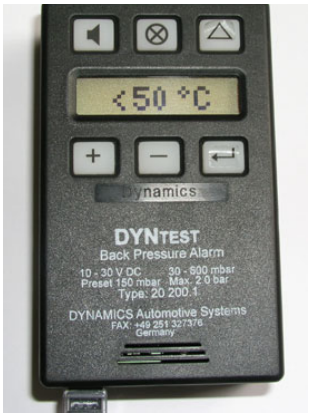
[Alarm/Monitor/Logger]

Particle-Filter Monitoring System

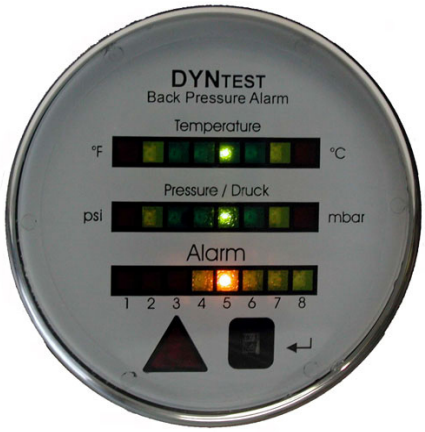
CONTROL BOX
with cable harness connected

PRESSURE CONNECTION SET
with installation instructions and mounting accessories

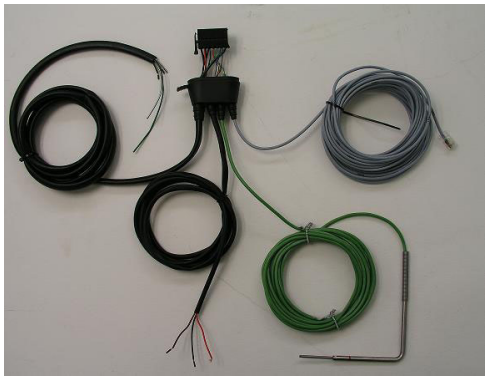
PANEL BOX ON ROAD
with bus-cable connection



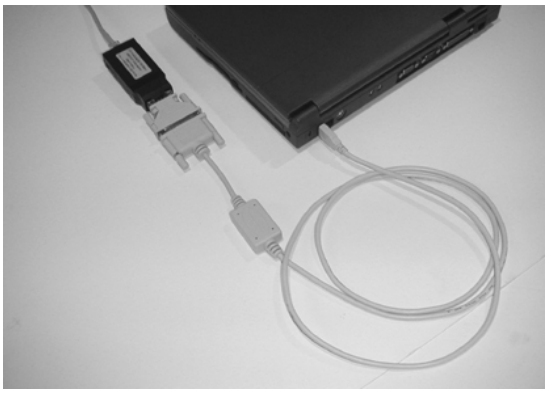
Panel Box OFF-ROAD
IP 67 (Special Accessory)



CABLE HARNESS



EVALUATION OF DATA



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DYNTEST

Particle-Filter Monitoring System

DESCRIPTION OF FUNCTIONS

The DYNTEST AML-S is a particle-filter monitoring system which will provide warnings when the particle filter in an exhaust system becomes clogged with diesel soot and causes potentially harmful build-ups of exhaust-gas back pressure. If the monitoring system detects back pressure levels which are too high or severe damage to the filter, it first of all provides a visual alarm for the user by means of illuminated display lamps, and then generates a further audible alarm.

In addition, the DYNTEST AML-S measures the temperature of exhaust gases before they reach the filter, and simultaneously measures the speed of the engine (in rpm).

Pressure, temperature and engine speed are continuously monitored and shown in real time on the display. While the pressure and temperature values are continuously written to memory, the engine speed is recorded whenever alarms are generated. The alarm will remain activated until the user consciously enters an acknowledgement to terminate it.

Pressure is measured in the range between 0 and 600 mbar. The temperature range extends up to 1000°C.

The driver can ascertain by means of the temperature display whether the exhaust-system temperature is within the optimum range for the filter. If a back-pressure alarm is generated, the driver can raise the temperature of the exhaust gas by increasing the engine load, thus causing the filter to clean itself. The exhaust-gas back pressure will then be reduced, and the warning light will be extinguished.

Upper Pressure Limit
When there is a build-up of soot on the surface of the filter, the exhaust-gas back pressure will increase. The switch point for the back-pressure alarm can be preset in accordance with the requirements existing for the individual engine or vehicle by means of the menu keys on the Panel Box. In the standard setting, the alarm is activated when the back pressure reaches 150 mbar. When an alarm is generated, the current pressure value starts flashing on the display.

Lower Pressure Limit
Severe damage to the filter, the exhaust-gas supply pipe, or the connection to the pressure sensor will result in a considerable reduction in pressure. If the values measured fall below the lower limit, an alarm is generated. The lower limit can be set at an appropriate value by means of the menu keys on the Panel Box. If an alarm is generated, the current pressure value will flash on and off on the display.

Testing of the Filter for Damage
If the filter has suffered minor or moderate damage, there will be a reduction in pressure, albeit of a less serious nature than would be the case if the pressure level were to drop to the lower pressure limit very suddenly. A test routine to determine the exact extent of the damage can be started at any time by means of the menu keys on the Panel Box. This test will automatically detect changes in current values by performing a comparison of these values with a reference value defined when the system was first set to work, or after a subsequent reset. If the values measured are not within a specific range (which can be freely defined), a corresponding message will appear on the display, and at the same time the test findings will be written to memory.

MEMORY DEVICES

The DYNTEST AML-S has two separate memories.

Memory for the storage of measured values
Pressure and temperature are continuously measured at 1 second intervals; mean values are computed, and these are stored in the memory together with the corresponding date and time.

On vehicles, a mean value is calculated from 10 measured values. The storage capacity of the circular memory is sufficient for 30 days if the vehicle is driven for not more than 10 hours each day.

Stationary engines may be in continuous operation for up to 24 hours at a time, with no great variation in the engine load. The mean values for such engines are therefore calculated on the basis of 30 measurements; these mean values are then stored for 30 days (i.e. for 30 periods of 24 hours).

After 30 days have elapsed, the oldest values are overwritten. The circular memory is only written to when the engine is in operation.

The choice between whether the DYNTEST AML-S is to be used in a vehicle or in a stationary context is made by means of a menu that can be accessed by means of the keys on the Panel Box.

Memory for the Alarm Function

Alarm reports (back pressure, break in the connection to the probe, etc.) and alterations to settings made in the Control Box SETUP menu are registered in the alarm-function memory. Each entry is stored together with a record of the relevant time and date, and a commentary. The non-volatile circular memory is designed for a service period of 10 years, and can store up to 1,000 data records.

ALARM OUTPUTS

If there is sudden damage to, or other unforeseen problems with, the filter system, immediate remedial measures (e.g. disconnection of the supply of additives, or the starting of regeneration) may be required.

For this reason, the system has been provided with two independent additional outputs, whose functions can be configured by means of the Panel Box (via the SETUP menu). After a comparison has been made with a switch point, desired value or time value, and with due allowance having been made for the hysteresis effect (delay time), a signal is output when a selectable pressure, temperature or engine-speed (rpm) value is reached.

When the engine is switched on again, the output signal is reset.

SPECIAL PROGRAMS

If more sophisticated functions are required than those permitted by the alarm-output configurations described above, pre-prepared programs can be retrieved via the menu available on the Panel Box. The special-purpose program called up is then assigned to one of the two alarm outputs.
The alarm output cannot be configured while the special-purpose program remains active.

CONTROLS

The DYNTEST AML-S performs continuous checks to ensure functional and plausibility criteria are observed. When errors occur, these are automatically recorded in the error memory, and "ERROR xx" appears on the display.

To prevent stored parameters from inadvertently being altered by operating personnel, DYNTEST AML-S is fitted with a software device that disables the maintenance-mode keys in the normal operating mode. However, parameters can be changed by authorized personnel at any time.

The DYNTEST AML-S can also be used to keep records of the operational cycles completed by a vehicle, and thus permits uninterrupted on-the-road monitoring of vehicles as they are being driven. It can be also be used to determine, for example, if it would be feasible, and worthwhile, to equip a particular vehicle with a self-regenerating filter.

Operating Mode

When the vehicle is in normal service, the **DYNTEST** particle-filtering monitoring system is in **OPERATING MODE**. That means the three keys in the top row are activated. The "visual alarm" (⊗) key and the "audible alarm" (🔈) key are pressed to acknowledge the corresponding alarm signals. The menu-navigation (△) key is used for scrolling through the various display parameters. It is also used to display current, temperature, pressure and engines-speed values. **Settings cannot be changed when the system is in the normal operating mode.**

Maintenance Mode

Operating parameters can be changed when the system is in **MAINTENANCE MODE**. The bottom row of keys is used to adapt the system configuration. In the normal operating mode, these keys are deactivated. They can be activated by pressing a combination of three keys simultaneously; however, this operation should be performed by **service technicians only**. Once the bottom row of keys has been activated, "UNLOCKED" appears on the display and the background illumination of these keys becomes brighter when they are pressed. The normal operating mode is restored by once again simultaneously pressing the combination of three keys referred to above. "LOCKED" will then appear in the display in confirmation of this step, and if the ignition is switched off, the monitoring system will automatically be restored to OPERATING MODE when it is switched on again.

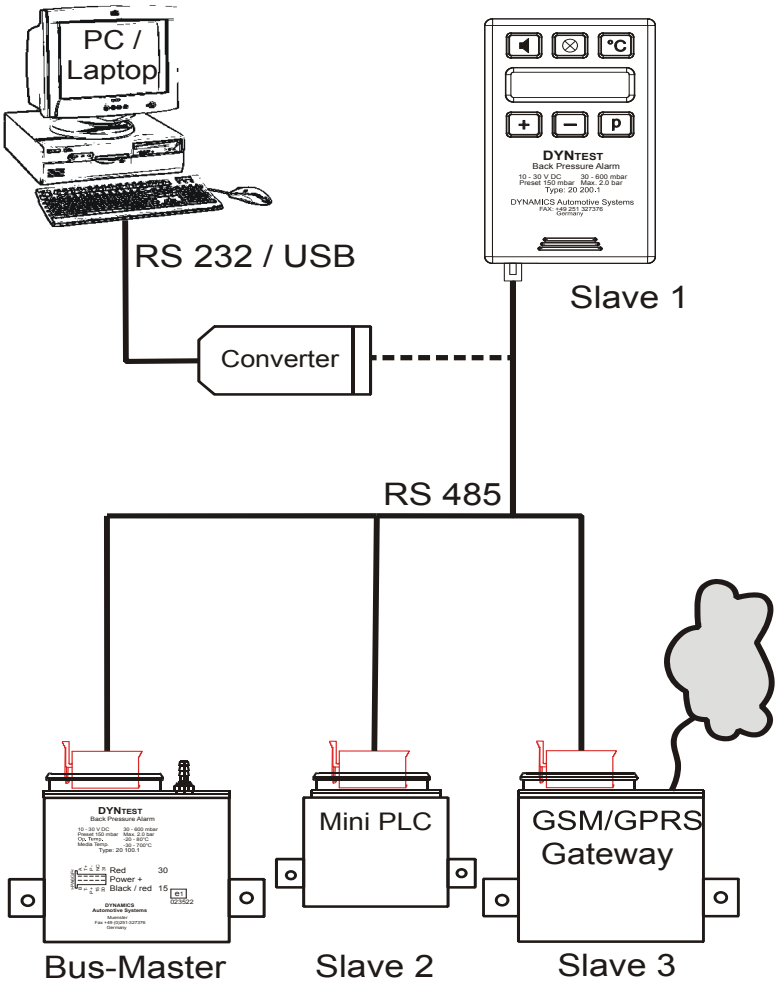
DYNTEST ANALYSER

The DYNTEST Analyser Set is for the transfer of data stored in the system memory to a PC for analysis. The data are transferred via a cable and RS232 or USB interface. The Analyser Set consists of a signal converter, a USB adapter cable, as well as data-transfer and data-analysis software. The analysis of the data is performed by an Excel routine installed in the computer. This routine enables the user to view the values measured, and print these out in the form of graphics. Two plaintext files (one for the alarm memory device, and one for the memory where measured values are stored) are created for the storage of the transferred data. In addition, a password-protected ZIP file is created to prevent manipulation of the data.

The file names are generated automatically out of a combination of the serial number of the Control Box and the download date.

The DYNTEST Bus System

The AML-S can be upgraded and transformed into the DYNTEST Bus System, which consists of a Control Box (Master), a Panel Box (Slave 1), a Mini-PLC/SPS (Slave 2) and a GSM/GPRS Module (Slave 3) with a converter and interface cable which are used to convert and transmit signals to a PC where the incoming data are written to memory and then analysed.



If required, separate information about each of the individual modules in the bus system can be provided.

DYNTEST

Particle-Filter Monitoring System

SYSTEM COMPONENTS SUPPLIED

The **DYNTEST** AML-S system (see illustrations on page 1) consists of the following components:

1. **CONTROL BOX** –to be installed in the engine compartment–

a) Connection to cable harness
b) Connection for pressure hose and pipes

2. **PRESSURE CONNECTION SET** –provides pressure connection between the filter, the moisture separator (if installed), and the Control Box–

   a) Stainless-steel fitting with clamp-ring connector
   b) Stainless-steel pipe, 54 cm
   c) HT hose (resistant to high temperatures)

3. **FUSE KIT** –integrated in the power-supply (permanent positive polarity); provides protection against overvoltage –

   a) Fuse
   b) Fuse holder
   c) Cable clamps (crimp connectors)

4. **CABLE HARNESS** –for the power supply, and for the connection between the Control Box and the Panel Box–

   a) Power supply (10-30 VDC)
   b) Input line and output line (I/O)
   c) Temperature probe, with 2-metre connecting cable
   d) 10-metre bus cable for the connection between the Control Box and the Panel Box; this cable is also used to transmit data to a PC for analysis

5. **DISPLAY** (Panel Box) –to be installed on the dashboard–

   a) Switchable illuminated display in which temperature, pressure and engine-speed (rpm) readings are shown; maintenance-mode menu items are also shown in this display
   b) 6 function keys, 2 of which illuminate and thus have a signal function
   c) Buzzer

Optional extras:

a) 5- or 10-metre extension cable (with plugs)
b) Moisture separator (recommended accessory)
c) Display for construction equipment or the like, protection type IP 67

DYNTEST

Particle-Filter Monitoring System

TECHNICAL DATA and SPECIFICATIONS

Control Box

Temperature

Ambient	-30… 80^{0}C
Measuring range:	50… 1050^{0}C

Pressure

Measuring range:	0 ... 600 mbar
Tolerance:	2% full of scale
Overpressure safe up to:	max. 2.0 bar
Power supply:	10 - 30 V DC
Current rating:	150 – 170 mA (in operation); 1 mA (standby)
Protection type:	IP66
Alarm outputs:	2 x 5A power high-side drivers, overload-protected, BTS 436
Inputs:	min. 9 V
Oscillation level:	10 g at natural frequency
Dimensions:	95 x 100 x 38 mm
Electrical protection:	reverse polarity, short circuiting and overvoltage. All electrical components and connections are encapsulated in synthetic resin
EMC protection e1; No.: 023522	suppressed against outgoing electrical interference; immune from interference caused by incoming electrical signals

Panel Box

Protection type:	IP44
Dimensions:	106 x 65 x 35 mm
Special-purpose equipment:	*protection type IP67*
Dimensions	*round, 80 mm diameter*

6 illuminated keys (2 with signalling functions)
Buzzer
Graphic display (illuminated)

Interface :	RJ 45 connector (Western type)

Voltage supply via the Control Box

Cable Harness

Temperature probe: K type	up to 1100° C

Oil- and water-resistant

Münster, February 2006