



- Early detection of diesel engine breakdowns
- Extend intervals between overhauls
- Avoid unnecessary maintenance
- Easy to use – quick to install
- Efficiency analysis of the turbocharger

ALPHABOX – the smart diagnostic system for diesel engines and turbochargers

ALPHABOX only requires the input signal from a speed sensor to analyze torsional vibrations as an early indication of efficiency loss and mechanical failure in your engine and turbocharger.

Designed for

- Quick return on your investment
- A cost efficient solution
- Easy to install and commission
- Maintenance-free use
- Remote and local access to data
- Easy to retrofit to engines
- Continuous monitoring and reporting
- Cylinder-by-cylinder diagnostics
- Early detection of engine problems
- Extension of engine lifespan
- Clear and concise report
- Entire fleet installation

No more unexpected breakdowns

Transport and logistic companies using diesel engine fleets are highly dependent upon reliable and on timely delivery of the goods. Breakdowns of trains, vessels or trucks can lead to significant economic losses. JAQUET can help fleet owners to prevent such economic losses during its operation by monitoring the engine with the ALPHABOX diagnostic system. The system is able to detect not only engine problems, but also issues with the turbocharger, well in advance, giving time to plan a maintenance cycle to prevent mechanical breakdowns.

Extended engine lifetime and quick return on your investment

ALPHABOX is a cost-effective engine diagnostic system with powerful functionality. It is easy to retrofit to combustion engines, providing a complete picture of the engine health including the effects of the whole power train. The ALPHABOX is based on analysis of the torsional vibration of the crankshaft. The system helps fleet owners to optimize maintenance cycles by transitioning from time-based to a condition-based maintenance. ALPHABOX extends engine life, while avoiding expensive breakdowns and reducing operational and maintenance costs.

Easy to install and put into operation

Only a single speed sensor is necessary to obtain the general engine health status. For a detailed cylinder-specific health analysis, two speed sensors are required, one on the crankshaft and one on the camshaft. With a turbocharger speed sensor, its efficiency and mechanical health can also be determined. The built in webserver allows easy configuration by a standard web browser (no software installation on your PC or other devices required).



Clear diagnostic reports

Major engine and power train parameters (combustion, compression, injection, bearings, ...) are indicated in green/yellow/red colors for clear interpretation. Green means "all ok", yellow highlights a condition that might need a follow-up in the next maintenance cycle and red indicates a severe problem which requires immediate intervention.

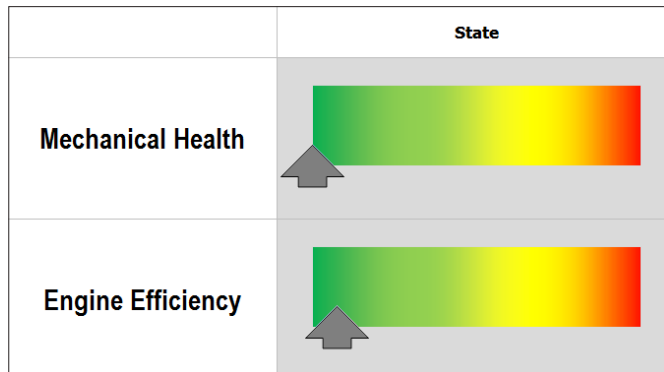
A modular concept

The ALPHABOX can be configured with various hardware modules (GSM and GPS, memory extension, I/O modules, bus connections etc.) to make it easy to integrate the diagnostic unit in an existing environment.

Features and Benefits

Product features	Customer benefits
Quick return of initial investment	Extended and optimized fleet lifetime Time-based maintenance to condition-based maintenance Significant cost reduction by better targeted maintenance
Easy to install	Combustion engines can be easily retrofitted No special training required Suitable for continuous or single measurements
Versatile usage	Used for inline, V-type and radial engines 2 stroke or 4 stroke engines Diesel or gasoline engines
Online data access	On-demand diagnostic results from control room possible Early detection of impending engine failures
Detailed diagnostics including cylinder-specific information	Easy for maintenance team to track down failures Only identified parts need to be replaced Customer can prioritize maintenance according to the seriousness of the engine condition

✓ Healthy engine

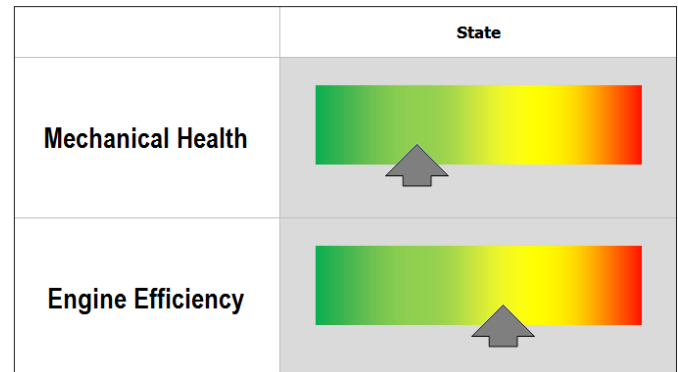


Indicator	Alarm	1	5	3	6	2	4
Compression/Variations	0.00						
Injection/Timing	0.33						
Injection/Condition	0.00						
Combustion	0.00						
Bearings Moving Parts	0.00						
Cam & Pumps/Regulation Air Intake / Suction	0.20						
Stresses	1.94						
Cyl. pressure/Variations	1.72						
Unbalance/Supports	0.12						

6 Cylinder Volvo Diesel engine

This engine shows all indicators in the normal range.

✗ Problematic engine



Indicator	Alarm	1	5	3	6	2	4
Compression/Variations	0.08						
Injection/Timing	0.79						
Injection/Condition	0.79						
Combustion	0.03						
Bearings Moving Parts	0.00						
Cam & Pumps/Regulation Air Intake / Suction	0.22						
Stresses	2.15						
Cyl. pressure/Variations	1.99						
Unbalance/Supports	0.12						

6 Cylinder Volvo Diesel engine

This report shows the effect of a defective fuel injector.

✓ Healthy turbocharger

Indicator	Turbo Speed	Turbo Speed Variation	Turbo Friction
Compression/Variations	7058	0.20	2.33

Turbocharger shows all indicators in the normal range.

✗ Problematic turbocharger

Indicator	Turbo Speed	Turbo Speed Variation	Turbo Friction
Compression/Variations	10707	4.81	3.13

This report shows an instability caused by a bad bearing resulting in a power loss of the engine.

Technical data

Supply voltage range:	Nominal : 24 VDC Range: 17 to 33 VDC (according to EN50155)
Maximum Power:	20 W
Communication interfaces:	CAN 2.0B, Ethernet 10/100 Mbit/s, IEEE 802.3, USB
Operating system:	Linux
Number of digital input channels:	8
Number of digital output channels:	7
Number of speed sensor inputs:	4
Operating temperature:	-40°C to +70 °C
Protection rating:	IP20
Max number of engines to be measured with one box:	2
Certificates:	CE, cULus, Ex EU 94/9/EC Zone 2, FCC, IECEx Zone 2, LR, UL HAZLOC Class I Division 2 (Zone 2) Fully compliant with RoHS and REACH, EN50155



Swiss know-how and quality matched to your demands

JAQUET manufactures speed sensors in quantities from 1 to millions per project per year. These typically customer specific solutions add value through being matched to individual applications. **Since 1889, a spirit of excellence complementing tradition and innovation.**



Automotive turbochargers

Turbocharger for trucks, passenger cars, construction equipment

- Speed of VG/VNT turbochargers
- Gearbox shaft and retarder speed



Railway systems

- Optimum traction control
- WSP (wheel slide protection) systems
- Speed information for automatic train control



Power generation

Gas, hydro, steam and wind turbines

- Overspeed protection
- Speed measurement and control



Hydraulics

Agricultural machinery, construction and mining equipment, cranes, ROV – remote operated vehicles

- Motors and pumps, flowrate measurement
- Position measurement, traction synchronization



Diesel and gas engines

Large diesel and gas engines in marine, rail, off-road applications and power production.

- Cam and crank shaft for dynamic position
- Turbocharger speed, engine diagnostics

Quality systems

ISO TS 16949
ISO 9001
AS 9100
IRIS

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