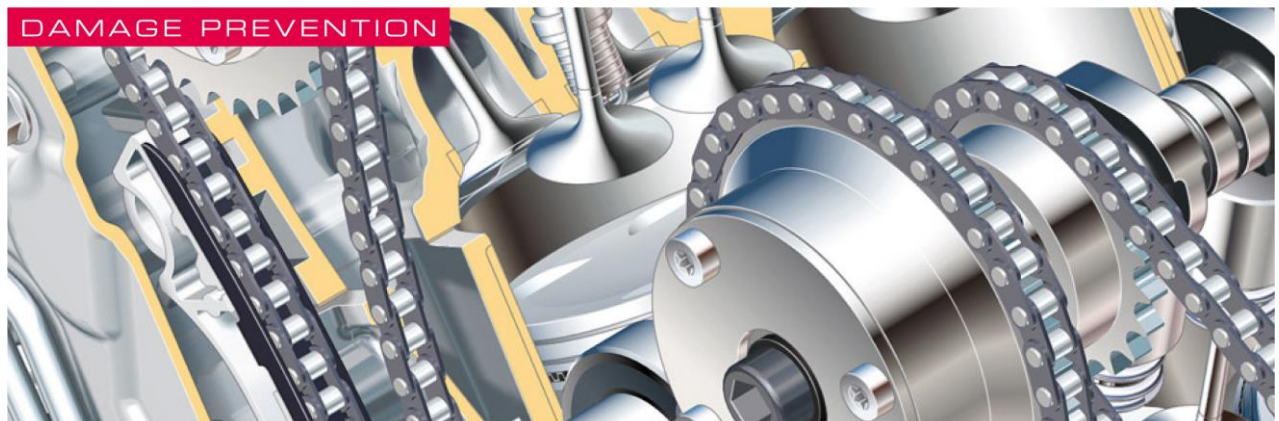


MIG16 SFE



Intelligent measurement technology for early recognition of damage – precise, versatile, efficient.

red-ant is a Munich-based team of dedicated specialists in NVH measurement engineering. For over 80 satisfied customers worldwide, red-ant sets new standards with high-precision measurement systems in vibration-analysis.

red-ant measurement technologies and services

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> Basics

> MIG 16 SFE

The standard-setter for early failure detection.

For long-term endurance testing in which motors and/or gears are subject to highly dynamic testing, a reliable system for the early recognition of damages is a must-have. MIG16 SFE is a highly flexible security solution for the long-term testing of transmissions and endurance tests for engines. It recognizes damage as soon as it occurs and thus saves your prototypes.



> Characteristics

MIG16 SFE monitors endurance testing for engines and transmissions, gears, axles, hybrid drive trains, turbo chargers and much more - without interruption, 24/7. The system measures the linear and torsion vibration of the prototype and compares the data with previously learned threshold values depending on the operating load. It recognizes damage as it arises and sends a turn-off alarm to the testing rig, if further operation is at risk from the damage. This allows MIG16 SFE flexible to protect your prototypes and your testing rig.

Gears, bearing and engine damage, wear and tear and switching noise is identified and mapped in the easy-to-verify documentation of the entire testing process. Our EasyReporting Software enables you to have meaningful evaluations of the measurement data in the blink of an eye in 24-Bit resolution.

Product benefits:

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Saving prototypes
.....

.....
Interruption-free monitoring (24/7) for endurance testing
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.....
Documentation of the entire test run
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.....
Clear analysis of the cause and course of the damage
.....

.....
No experts needed for use
.....

.....
Self-learning methods
.....

MIG16 SFE's characteristics at a glance:

- > Highly flexible application for testing engines, transmissions, gears, axles, hybrid drive trains, turbo-loaders and wind energy equipment
- > Multi-channel 24-Bit measurement data logging and recording
- > Calculation of the indicators relevant to damage (high resolution order analysis, short-term effectiveness, speed fluctuation)
- > Logical follow-on processing of advance alarms to avoid erroneous turn-offs
- > Report generator for rapid evaluation

MIG 16 SFE recognizes

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Gear damage
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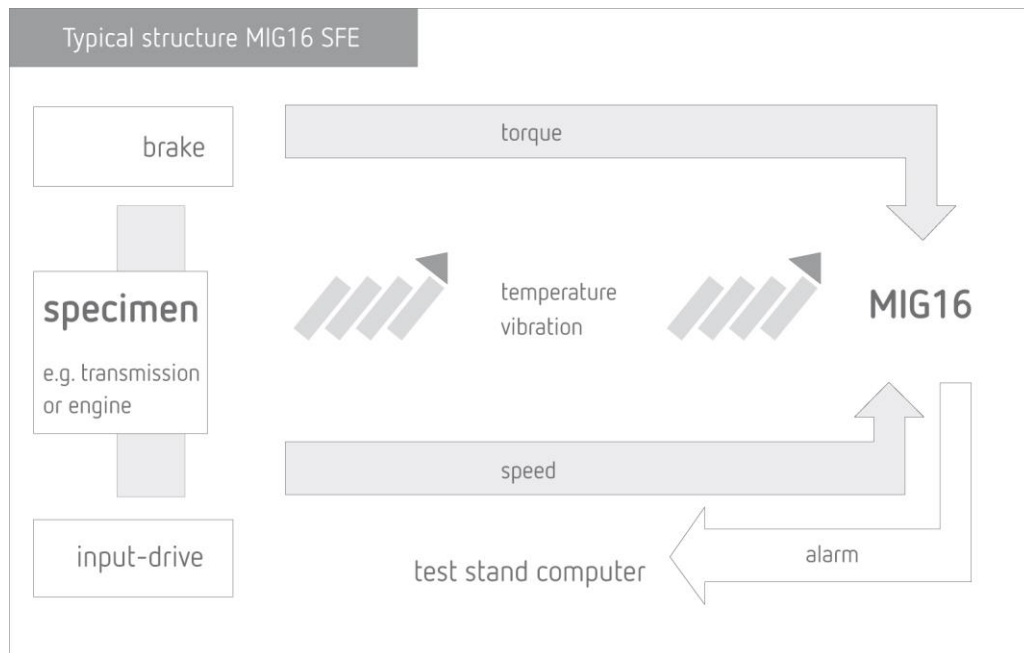
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Bearing damage
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Engine damage
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Wear and tear
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Switching noise
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> Use Case



Application examples for MIG16 SFE

- > Long-term testing for Transmissions
- > Endurance testing for engines
- > Health monitoring for machines
- > Testing drive trains, turbo-chargers and wind energy equipment
- > Rigidity verification / operating rigidity
- > Material testing

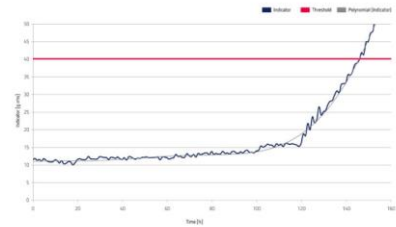
Just ask us if MIG16 SFE is also suitable for your application!

> Technical Data

When building the products...

red-ant exclusively uses premium components from well-known manufacturers. This means that we also make a further contribution to increasing the capacity uptake of the test rig in testing and production. Because we know: Every hour that a test rig can't be used because of a defect in the control technology costs you money and causes unnecessary delays in lean workflows.

Early damage recognition



The hardware...

all of red-ant's products have a modular structure, the proportion of in-house hardware development is low. This means that users benefit directly from the rapid further development of the entire control technology market: if new technology is available and has grown out of the cradle, we use it in our products to your advantage. That is faster, more cost effective and robust than any in-house development!

MIG16 software...

is at the heart of red-ant's products. This is where we have bundled all of our vibration-technology expertise and made this available in a user-friendly form in our products functions. Of course we also use all of the tried-and-trusted, standardized NVH methods that are on the market.

You can find an extract of the technical hardware data in the following list:

Supply voltage transformer

Supply voltage range	100 V-230 V
Supply voltage frequency	50 Hz or 60Hz
Input current	5 A

PC

Processor	Intel XEON 4x3, 4GHz
Memory	8 GB
Ethernet	100 MBit/1000 MBit
Hard drive	SATA3,RAID, 2xSSD + 1TB HDD
External interface	Rs232, USB 2.0, USB3.0
Operating system	Windows 7 Professional 64bit Windows 7 Ultimate 64bit

Permissible environmental conditions

Temperature range while switched on	0 to 40 °C/optional up to 60 °C
Temperature range when switched off	-20 to 70 °C
Relative humidity	not-condensing

AD card - static characteristics

Number of channels	4, 8, 12, 16 – more upon request
Max. sample rate fS	102.400 S/s optional also more than 102,4 Ks/s
Analog digital converter	Delta-Sigma (1 per channel)
Adjustable sample rate fS	fS 1kS/s up to 102,4 kS/s in 1 S/s stages freely selectable
Resolution	24 Bit nominal
Input range	+ -10 VSS
Input impedance positive input	1MOhm parallel to 160 pF

AD card - dynamic characteristics

Delta-Sigma-Analog-Digital-converter Over sampling	128*fs (for 1,0 kS/s ≤ fs ≤ 51,2kS/s) 64*fs (for 51,2 kS/s < fs ≤ 102,4 kS/s)
Digital anti-alias filter	FIR filter, corresponds to a 64-pole filter, no verifiable over-vibration, extremely flat frequency (±0,1dB) with perfect, error-free phases
Additional analog anti-alias filter to filter narrow-band alias frequencies for the digital filter with 64-fold fs	2-pole Bessel low-pass filter ff analog = 400 kHz
Filter amplitude frequency	
-0.1 dB point	0,4535 fs
-3 dB point	0,4863 fs
-110 dB point	0,5465 fs
Lower sampling-free (alias free) frequency range	DC (0 Hz) bis 0,4535 fs
Alias threshold frequency (-110db)	0,5465 fs
Defect-free, dynamic range	
fs ≤ 51,2Hz	130 dB
fs > 51,2Hz	118 dB
Frequency precision	0,00005%
Amplification error between two channels	± 0,1 dB
Phase error between two channels	< fin (in kHz) *0,018° + 0,082°
Crosstalk between channels on one card	< -90 dB
Crosstalk between channels on different cards	< -100

Calibration of analog channels

Calibration by software with internal per voltage frequency	Calculates reinforcement and offset correction factor
Recommended interval for software calibration	If environmental temperature differs by 10°K from last calibration
External calibration of voltage frequency	Values internal voltage frequency and saves this in non-volatile memory
Recommended interval for external calibration	1 year
Warm-up period for calibration	15 minutes
Internal voltage reference	
Same voltage amplitude	5,000 V ± 2.5 mV
Temperature coefficient	± 5 ppm/°K max
Long-term stability	± 20 ppm/(1000h) 0,5

Realtime further processing of analog channels

Conversion to physical units	32-floating-point linear or any volt/unit curve form for which parameters can be set by software or in data-reduction mode 16 or 8 Bit
Data reduction resolution	By channel either 2 or 4 fold
Data reduction sampling	By channel from 1 to 128 fold
Data reduction time	Intelligent data reduction for endurance testing. Freely selectable initial and end period and target memory volume. Data between the initial and end period are intelligently reduced, so that a distribution of samples is available at the end of the test.

Alarm outputs counter card or siko card

Number of digital outputs	2-8
Function of alarm output 1	0 Volt (normal) 5 Volt (alarm) can be programmed in channel set-up menu
Function of alarm output 2	0 Ohm (normal) >1 MOhm (alarm) can be programmed in channel set-up menu

Speed and event inputs counter card

Number of speed and event inputs	Up to 6
Maximum frequency of the speed signal with input 1, 2	200 kHz
Maximum frequency of event inputs	20 kHz
Trigger mode	falling and/or rising flank
Trigger voltage	0-1 Volt Low 2-5 Volt High

Measurements MIG16 – 19" system

Width	440 mm (19" insert)
Height	173 mm (4 HE)
Depth	540 mm

CE conformity

MIG16 from red-ant measurement technologies and services meets the CE requirements for low voltage (security) 73/23/EEC and for electromagnetic compatibility (EMC) 89/336/EEC.

> Support

By choosing red-ant products you have not only decided to use top-quality measurement systems, you also get what has made us famous: our unique user support. At red-ant you are in contact with real experts who know what you, the user of our systems, need in critical situations - namely clear answers and solutions that can be implemented for your task in hand. That's our specialty.

red-ant service for MIG16 SFE

We want you to get optimum results right from the very start when using MIG16 SFE for early damage recognition. That is why a suitable support and service package is additionally offered when you buy a red-ant measurement system.



Of course you can always upgrade your service level in order to enjoy additional support services, such as personal on-location service, or free hardware updates for generation changes.


Range of services for early damage recognition

As experts for vibration analysis, we have specialist expertise which we can put to optimum use in concrete cases for early damage recognition. In order to ensure that you, as a user of MIG16 SFE, can benefit from this expertise, we make it available as individual services, training sessions or workshops.

Frequently requested services:

- > Detailed evaluations of damage events „What happened when?“
- > Process development: Working out new damage indicators
- > Creating customer-specific reports incl. presentation to clients
- > Temporary provision of measurement equipment

We are also happy to take over the complete support of your tests.


PREMIUM-PACKAGE

Additional service for demanding systems.

Go-live on location
yes

Introductory training
Annual in-depth for two employees

Telephone support
9 a.m. to 5 p.m.

Exchange service
in the event of damage
yes, within 48 hours

Remote diagnosis via Internet¹
yes, inc. error rectification

Laying signal lines
yes

Expert sessions²
2x per year

¹ Remote diagnosis via Internet
red-ant support employees use Internet or ISDN access to dial into the measurement system on location via secure lines. Users and red-ant employees can see and operate the system together. Questions are clarified together with the user right there at the measurement equipment. This ensures fast reaction times and an optimum transfer of expertise. red-ant supports all of the available remote diagnosis tools (remote desktop, NetViewer, TeamViewer, VNC, PC-Anywhere, NetMeeting, and many more).

² Expert session
Support for all types of user questions when using the system. For example: Are the signals connected correctly? Start of a new test run. Turning off the test run by the measuring equipment - what has to be done? Breaking down the prototype or carrying on with the test run? Creating final reports. Detailed analysis of the measurement data.