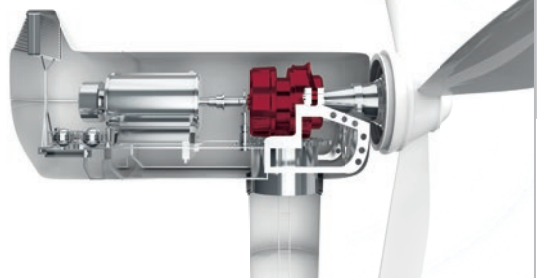
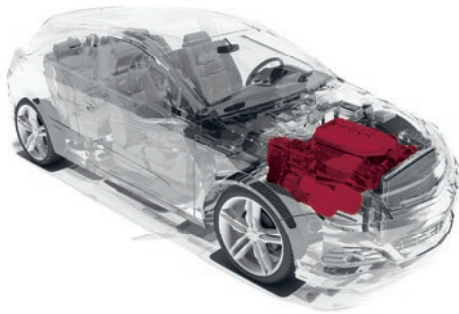


ROTEC

TORSIONAL VIBRATION PROFESSIONALS



MEASUREMENT TECHNOLOGY

FOR TORSIONAL VIBRATION ANALYSIS
AND ADVANCED MEASUREMENT TASKS

ABOUT US

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Rotec reserves the right to make corrections, enhancements, improvements and other changes to its products. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete.



EDITORIAL

We look back to 1988, when Karl-Rainer Feuring founded ROTECH to equip automotive developers with specialized measurement systems for torsional vibration analysis of combustion engines. The success of his business idea proved him right and ROTECH became the market leader in torsional vibration analysis. Three decades later, the automotive industry is undergoing a major change: Powertrain variety is increasing as are alternative automotive concepts. At ROTECH, which now belongs to the VISPIRON Group, we are strengthening our offer in the mechanical and plant engineering, shipbuilding and energy sectors. Among other things, we equip wind farms with new ROTECH measurement and monitoring systems. And we do not stop at product development. We are continuing to develop and optimize the quality and flexibility of the measurement systems. The longevity and reliability of the measurement systems are an elementary component of our measuring technology. Our practical philosophy and our customer proximity, paired with our unique competence in the field of hardware and software, make us a strong and reliable partner. We are also expanding our range of services with ROTECH ENGINEERING to provide our (potential) customers with engineering advice on all aspects of their measurement needs. We look forward to the challenges of the next 30 years, which we will master with new products and services.



C. Lehne

*Christopher Lehne, Managing Director
VISPIRON ROTECH GmbH*



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MEASUREMENT TECHNOLOGY AND ENGINEERING FROM A SINGLE SOURCE

ROAD TO SUCCESS

Karl-Rainer Feuring founded VISPIRON ROTEC GmbH in 1988 as Rotec GmbH in Munich to provide companies in the automotive development industry with specialized testing systems. With the flexibility of a small company and the commitment and ambitions of the development team, Rotec quickly achieved considerable success. The service portfolio was specified, tailored to concrete customer requirements and ROTEC measurement technology for torsional vibration analysis was developed. In 2008, the company was taken over by Amir Roughani, Founder and Managing Director of the VISPIRON Group. Since 2017, Christopher Lehne has served as Managing Director of VISPIRON ROTEC GmbH.

Over the past few years, the company has entered new markets such as the energy sector, mechanical and plant engineering and shipbuilding, and rolled out its worldwide sales network.

ROTEC ENGINEERING was founded in 2018 due to the great demand for engineering services for complicated measurements and analyses in the automotive sector.

MARKET LEADER IN TORSIONAL VIBRATION ANALYSIS

We are the world's leading company in the development, production and distribution of equipment for the sophisticated measurement and analysis of torsional vibrations. Our measuring technology impresses with its unique measuring principle, high angular resolution and high-precision measurement data acquisition.

COMPETENCE FOR ADVANCED MEASUREMENT TASKS

We also offer sophisticated engineering services in all areas of dynamic component and assembly testing with regard to complex functional analyses. With outstanding component and system competence, we support complete development projects or provide advice on measurement questions, individual requirements and measurement data analysis with individual special solutions.

MADE IN GERMANY

We develop and produce our measurement technology and the associated analysis software in Munich. Our products are characterized by the long-standing know-how of our employees and the experience gained over more than 30 years.

BENEFIT FROM OUR KNOW-HOW

RESEARCH AND DEVELOPMENT

Wherever high-frequency, resonance-prone vibrations occur in the drivetrain, ROTEK products are the choice for our customers. Our success is based on 30 years' experience in continuous and innovative product development, along with intensive, ongoing cooperation and conversation with our customers. We give your developers the assurance that the function of your product corresponds to the nominal values and that you can locate and eliminate errors in the event of deviations.

QUALITY ASSURANCE

Product safety and quality are essential for our customers and it is impossible to imagine many companies' quality assurance systems without our measurement technology. Our products provide the necessary information for the analysis, evaluation and control of technical processes and products.

MONITORING

Our team and our ROTEK technology are also available for condition monitoring, i.e. for the permanent monitoring of systems in which, for example, safety or cost risks arise due to torsional vibrations. This can play a role everywhere: in the transmission of a car as well as in a wind turbine, a steam turbine or a ship's diesel engine.

PREDICTIVE MAINTENANCE

With predictive maintenance, we identify scenarios on the basis of long-term measured data that could lead to malfunctions in the medium term. Through the permanent monitoring of your systems and installations, we receive large amounts of data which are used to trigger an alarm when defined limit values are reached or undesirable patterns are detected.

WHY OUR CUSTOMERS TRUST US

HIGH-END SOLUTIONS FROM A SINGLE SOURCE

With our measurement technology, we support the complete measurement chain from sensors, amplifiers and mainframes with measurement cards to analysis and evaluation software. Our engineers provide you with valuable expert knowledge for advanced measuring tasks and offer you individual solutions, in addition to consulting.

MARKET-LEADING MEASURING PRINCIPLE

The ROTEK measuring principle is market-leading and unique due to its parallel acquisition of angular and time-equidistant measurement data and its high angular resolution. This allows you to implement meaningful analyses and simulations for your quality assurance or monitoring.

MODULAR AND FLEXIBLE

You can easily adapt the ROTEK measuring system to your company and your measuring tasks. You can equip the modular RASdelta device series with the required measurement cards, depending on the application. The ability to connect several RASdelta systems to a cluster enables you to perform multichannel measurements.

GLOBAL

Through our broad sales network and cooperation with sales partners, our services and support are available globally.

OUR SOLUTIONS

AUTOMOTIVE

From suppliers to OEMs: We support you along the entire measurement chain when it comes to combustion engines, valve trains or electric powertrains, to name but a few.

SHIPBUILDING, CONSTRUCTION MACHINERY

Torsional vibration investigations in the fields of shipbuilding and construction machinery place very special demands on measurement technology. High reliability and robustness – for mobile use at sea or in a mine, are required to carry out reliable measurements under the most difficult conditions.

TIMING AND AUXILIARY DRIVE

The increasing demands placed on combustion engines in terms of efficiency, emissions, friction, performance and acoustics call for continuous improvement and optimization of timing and auxiliary drives. This requires reliable vibration measurements and analyses of the individual components of the belt or chain drive. With our measuring system, we guarantee precise, reliable and fast analysis results of slip analysis, Tensioner tuning as well as resonance and stress analysis.

VEHICLE TRANSMISSION

Noise reduction in the transmission is an important development goal in the development of motor vehicles. Rattling noises occur predominantly in synchronized vehicle transmissions under torsional vibrations or when excited by gear teeth. We provide you with a powerful, high-resolution measuring system and engineering know-how with which you can check transmission units for noise and perform vibration analyses.

VALVE TRAIN

Valve train systems control charge changes and are therefore a key factor in achieving emission and consumption targets. The components of the valve train system are exposed to high loads due to mechanical forces and temperatures. To avoid this, you must measure them precisely and adjust them optimally. We provide you with market-leading measurement technology for this purpose. Important analysis includes valve lift, speed and acceleration, opening and closing behavior as well as resonance and stress analysis.

COUPLING, TORSIONAL DAMPER AND DUAL MASS FLYWHEEL

For the design, tuning and optimization of clutches, Torsional dampers and dual mass flywheels in passenger cars, trucks, motorcycles and racing, you can use the mobile, compact ROTEK systems on the test bench and in driving tests.

NOISE, VIBRATION, HARSHNESS

Self-excited friction oscillations, which cause body-to-airborne noise, lead to undesired driving noises. We offer you reliable investigations of noise, vibration and harshness with suitable measurement technology and expert knowledge.

ENERGY

Torsional vibrations acting on wind turbines and turbines in power plants lead to wear and system failures. To optimize the vibrations, we support you with suitable measurement techniques and engineering services.

WIND TURBINE GEARBOX

The excitation from the gears in the gear drives of wind turbines affects the form of structure-borne sound vibrations and undesired noise emissions. Incorrect tooth meshing with transmission errors also leads to rapid wear of the individual components. We identify these sources of error using suitable measuring technology and guarantee you high-quality monitoring of your systems to avoid cost-intensive damage and component failures.

TURBINES

With gas and steam turbines, you use ROTECH technology to monitor relevant vibrations and initiate emergency measures if critical limit values are exceeded. ROTECH systems are also used in the development areas of turbine manufacturers and help to develop turbines in line with today's requirements.

MECHANICAL AND PLANT ENGINEERING

ROTECH measurement technology products are also used around the world outside classic automotive applications. The high accuracy of the measurement technology and the option of mobile application are always the decisive criteria for the choice of ROTECH products.

SINGLE FLANK TESTING

The conventional single flank test, which is carried out according to DIN 3960 at low speeds (approx. 20 rpm) and low load, is very suitable for assessing the manufacturing quality of gears. This method ensures numerical comparability of the results, independent of any different framework conditions for individual investigations.

Due to the high clock frequency of the ROTECH speed board, leading companies in the field of gear quality testing rely on ROTECH measurement technology.

ROLLERS AND CYLINDERS

Vibrations in paper machines impact paper quality and cause a high frequency of tears. With our powerful measurement system, you can precisely record all relevant measurement data on drying cylinders, guide rolls and drive gears and analyze them so that you can optimize them using the data on rolls and cylinders. Through permanent monitoring, and with the help of our experts, you can use your machines throughout their normal service life.

PRODUCT OVERVIEW

We focus on the reliable and high-performance measurement and analysis of speed, acoustic, analog and CAN signals from individual components. We offer you precise, high-resolution and application-oriented measurement technology, evaluations and simulations.

SENSORS



ELECTRONIC UNITS



SPEED SIGNALS



SIGNAL PROCESSING

& Amplification



ANALOG / CAN / DMS / TEMPERATURE SIGNALS

YOUR BENEFITS:

- ✓ Modular design
- ✓ Parallel acquisition of angle- and time-equidistant measurement data

RASdelta MAINFRAME WITH MEASUREMENT BOARDS

ANALYSIS & SIMULATION SOFTWARE



MEASUREMENT DATA AQUISION

Storage



ANALYSIS
ANIMATION
SIMULATION

- ✓ High angular resolution
- ✓ High channel density

RASdelta MAINFRAME

The robust RASdelta mainframe is available with 8 and 16 measurement board slots. RASdelta measurement boards can be exchanged, depending on the application. Due to its compact format and low weight, the hardware is suitable for mobile use and easy transport. The mainframe is resilient and temperature insensitive, due to the integrated fan. Existing sensors and electronics of the ROTEC RAS FireWire series are compatible with the RASdelta series. The integrated touch panel display enables you to operate the system as a data logger without a measuring laptop. Measurement tasks with high channel counts can be completed by synchronizing several front-ends (RASdelta cluster).

ADVANTAGES:

- ✓ Modular and expandable
- ✓ Flexible and application-oriented



- ✓ Compact and mobile
- ✓ Robust and temperature resistant

RASdelta 8 MAINFRAME

RASdeltaFE08

The RASdelta 8 is the smallest measuring system of the RASdelta series. You can equip the front-end with one master board and up to seven measurement boards.



RASdelta 8 MAINFRAME BACK



RASdelta 8 MAINFRAME FRONT

TECHNICAL SPECIFICATIONS

Measurement board slots	8
Data transfer	- Clock synchronous operation of several devices through I/O synchronization - 2 high-speed Gigabit ethernet ports for data-uplink - Overall maximum net data transfer rate of about 80 Mbyte/s - Up to 100 Mbit/s data rate per measurement board - Up to 1000 Mbit/s overall data rate through Ethernet link - Long-term stability through 1 MHz high precision clock
Power supply	- DC-power supply 60 watt - Input voltage range 6 to 30 V
Size and weight	- Height: 69 mm (base dimension 263 mm x 227 mm) - Weight: 2,75 kg incl. 8 measurement boards (3,30 kg with AC/DC power supply)
Other	- Embedded controllers and display units - 2.8 inch integrated touch panel display for setup and status information - USB interfaces for storage and remote control - Temperature regulation by controlled fan

RASdelta 16 MAINFRAME

RASdeltaFE16

The RASdelta 16 has 16 slots for trigger and measurement boards. You can equip the front-end with one trigger board and up to 15 measurement boards.



RASdelta 16 MAINFRAME BACK



RASdelta 16 MAINFRAME FRONT

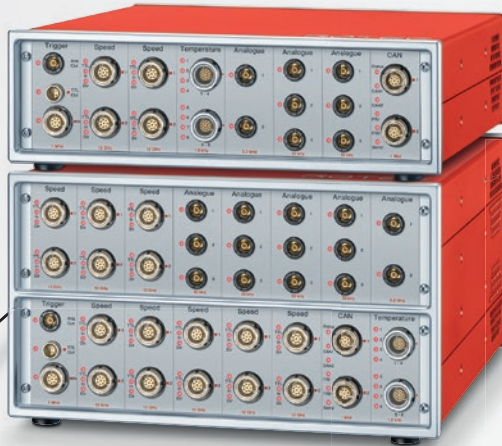
TECHNICAL SPECIFICATIONS

Measurement board slots	16
Data transfer	- Clock synchronous operation of several devices through I/O synchronization - 2 high-speed Gigabit Ethernet ports for data-uplink - Overall maximum net data transfer rate of about 80 Mbyte/s - Up to 100 Mbit/s data rate per measurement board - Up to 1000 Mbit/s overall data rate through Ethernet link - Long-term stability through 1 MHz high precision clock
Power supply	- DC-power supply 120 watt - Input voltage range 6 to 30 V
Size and weight	- Height: 128 mm (base dimension 263 mm x 227 mm) - Weight: 4,55 kg incl. 16 measurement boards (5,75 kg with AC/DC power supply)
Other	- Embedded controllers and display units - 2.8 inch integrated touch panel display for setup and status information - USB interfaces for storage and remote control - Temperature regulation by controlled fan

RASdelta CLUSTER

You can modularly expand the number of channels by coupling the RASdelta front-ends to each other via the Ethernet and Sync interfaces. One of the front ends acts as master system and synchronizes the other devices in the cluster. The ROTEC software recognizes the RASdelta cluster as an extended front-end with additional slots.

RASDELTA 8 MAINFRAME
RASdeltaFE08



RASDELTA 16 MAINFRAME
RASdeltaFE16



RASDELTA 16 MAINFRAME
RASdeltaFE16

RASDELTA 8 MAINFRAME
RASdeltaFE08



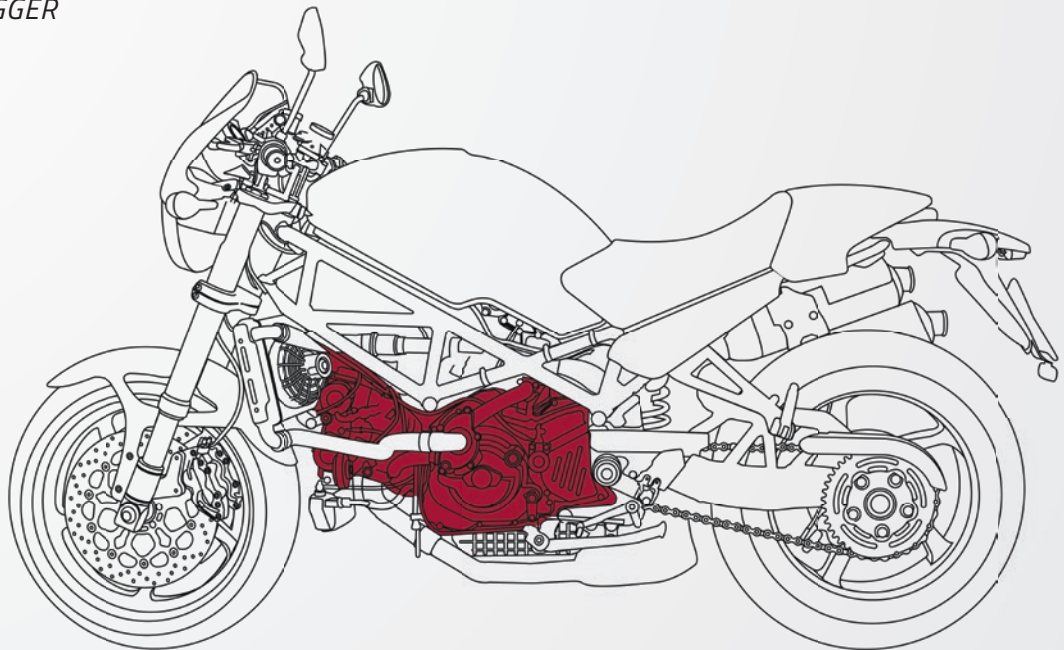
RASdelta DATALOGGER

SWRASdeltaDL

With the optional data logger module, you can convert your RASdelta 08 or 16 front-end to a data logger for mobile use such as in motor vehicles, on motorcycles, in racing cars or for applications at sea. The RASdelta runs in data logger mode without a measuring laptop, whereby all functions for operating the system can be executed directly at the RASdelta front end. Touch operations on the display enable measurements to be configured and carried out. All configuration and measurement data are stored on a micro SD card with USB adapter and can later be transferred to a PC for evaluation.



RASdelta DATALOGGER



MEASUREMENT BOARDS

Do you have many and different measurements, which vary depending according to the application? Then benefit from our modular and flexible RASdelta measurement boards! We offer you comprehensive and application-oriented measurement data acquisition of torsional vibrations, temperature, acceleration, velocity and sound. Depending on your requirements, you can interchange the powerful boards and adapt them to your measuring device.

RASdelta SPEED BOARD
RASdeltaSPD

RASdelta ANALOG BOARD 50 KHZ
RASdeltaANA



RASdelta TRIGGER BOARD
RASdeltaTRG

RASdelta ANALOG BOARD 3,2 MHZ
RASdeltaHSA

ADVANTAGES:

- ✓ Time synchronous
- ✓ Modular

RASdelta CAN BUS BOARD
RASdeltaCAN

RASdelta TEMPERATURE BOARD
RASdeltaTMP

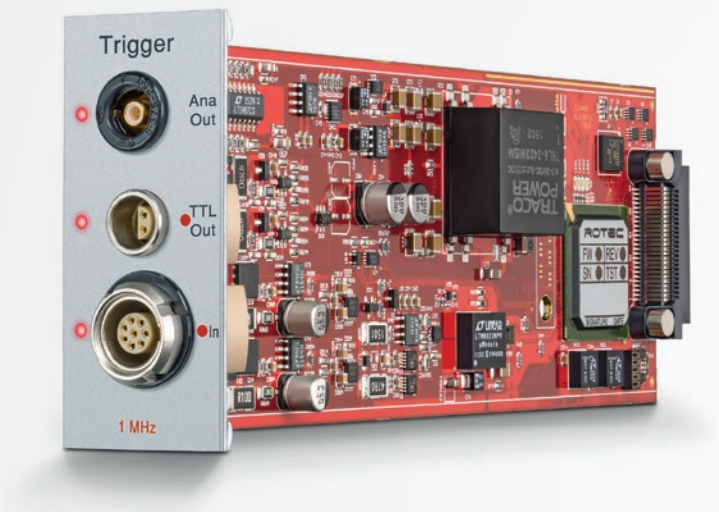


RASdelta DMS BOARD
RASdeltaDMS

RASdelta TRIGGER BOARD

RASdeltaTRG

The powerful RASdelta trigger board synchronizes all measurement data between channels, acquisition modules and connected front-ends. It is an integral part of the RASdelta.



TECHNICAL SPECIFICATIONS

Input channel	1
Connector	8-pin Lemo
Output channels	2 digital TTL outputs, 1 analog output
Connector	3-pin Lemo (digital) and SMB (analog)
Maximum input frequency	20 MHz
Further functions	- Power supply for external electronics - + 5 volt and + 12 volt - 5 watt per channel - short-circuit proof

RASdelta SPEED BOARD

RASdeltaSPD

With the RASdelta speed board, you record precise, multi-channel and digital speed measurement data for all transmission, control and auxiliary drive tests. It is the basis for torsional vibration analysis. The data is acquired via magnetic, angular equidistant scanning of a gear wheel, optical scanning of a stripe pattern or via incremental encoder.



TECHNICAL SPECIFICATIONS

Input channels	2, galvanically isolated
Resolution	12,3 GHz
Connector	8-pin Lemo
Maximum (output) pulse frequency	- 1 MHz per channel with two-channel operation - 2 MHz with one-channel operation
Maximum input frequency	20 MHz
Further functions	- Internal pulse divider (optional / required, if > 2 MHz) - Variable trigger levels from 0,3 to 4,5 volt - Trigger on falling, rising or both edges - Power supply for external electronics: - + 5 volt and + 12 volt - 5 watt per channel - Short circuit protected
Overvoltage protection	+/- 80V
Measurement modes	Speed, frequency, duty cycle or on/off-ratio

RASdelta ANALOG BOARDS

With the RASdelta analog boards, you can measure analog quantities such as airborne and structure-borne noise, acceleration, temperature, displacement or pressure. These quantities can be used, for example, to determine the position of a sound source or to carry out detailed valve train or cylinder pressure investigations.

RASdelta ANALOG BOARD 50 KHZ

RASdeltaANA



TECHNICAL SPECIFICATIONS

Input channels	3, differential, galvanically isolated
Max. sampling frequency per channel	50 kHz
Analog bandwidth	24 kHz
A/D converter	24-Bit Sigma-Delta
Connectors	SMB
Upper input voltage range	- 2 balanced input voltage ranges of 80 and 40 volts - DC coupling - No ICP power source
Lower input voltage range	11 balanced input voltage ranges of 20, 10, 5, 2.5, 1.25 volt and 625, 320, 160, 80, 40 and 20 mV - AC and DC coupling - ICP power source

RASdelta ANALOG BOARD 3,2 MHZ

RASdeltaHSA



TECHNICAL SPECIFICATIONS

Input channels	2, galvanically isolated
Max. sampling frequency per channel	3,2 MHz
Analog bandwidth	1,2 MHz
A/D converter	16-Bit Sigma-Delta
Connectors	SMB
Upper input voltage range	- 3 balanced input voltage ranges of 0.1, 1 and 10 volts - AC and DC coupling - ICP power source

RASdelta CAN-BUS BOARD

RASdeltaCAN

With the CAN-BUS board, you can record CAN and OBD-II data and evaluate it in relation to torsional vibration. This allows you to include already available quantities in the measurement without further sensor applications.



TECHNICAL SPECIFICATIONS

Input channels	2, galvanically isolated
CAN standard	- 2.0 A (11-Bit-Identifier) - 2.0 B (29-bit Identifier)
Baud rate	1 Mbit/s per channel
Connector	8-pin Lemo
Operating mode	Passive Listener, Polling (OBD-II)
Further functions	- Switchable CAN terminating resistor (120 Ohm) - Built-in signal filtering and decoding engine

RASdelta DMS BOARD

RASdeltaDMS

The RASdelta strain gauge board is an integrated two-channel DC voltage amplifier for signal acquisition from strain gauge-based, piezoresistive, magnetoresistive or potentiometric transducers. These include force, torque, pressure, displacement and angle sensors or scales.



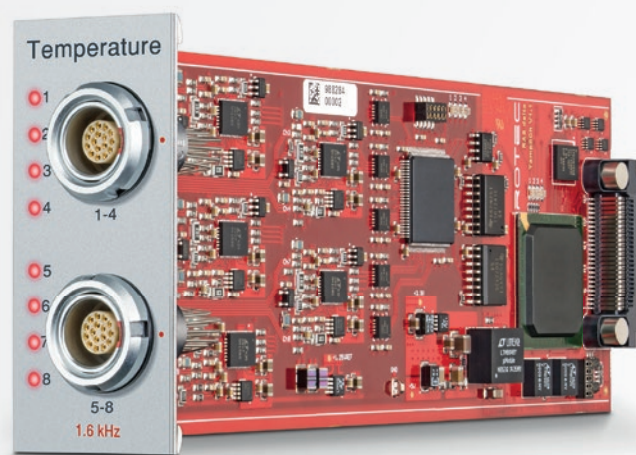
TECHNICAL SPECIFICATIONS

Input channels	2, galvanically isolated
Max. sampling frequency	50 kHz
Bridge supply voltage	1, 2.5, 5 and 10 V
Bridge types	Full and half bridge
Connector	8-pin Lemo
Further functions	- Burn out detection / line break - Four-wire and six-wire operation - Automatic zero adjustment - DC coupling - Compensation of the measuring lead resistance

RASdelta TEMPERATURE BOARD

RASdeltaTMP

With the RASdelta temperature board, you record measurement data from resistance thermometers and thermocouples. The measurement of the oil temperature in vehicles is indispensable, especially for transmission tests.



TECHNICAL SPECIFICATIONS

Input channels	- 8, with 6-800 Hz sampling rate per channel - 4, with 6-1600 Hz sampling rate per channel
Temperature range	- -200° C to 850° C
Coupling	- 2-wire configuration for Pt100/1000 and thermocouples - 4-wire configuration for Pt100/1000
Supported sensors	- Pt 100/1000 - Thermocouples type J (Fe/CuNi) - Thermocouples type K (NiCr/CrAl) - Thermocouples type T (Cu/CuNi)
Precision	- +/- 0,1° C (for Pt100/1000 in a four-wire configuration at room temperature)
Resolution	- Thermocouples 0,1° C - Pt100/1000: 0,01 °C



SENSORS

The unique ROTEK sensors complete the portfolio for measurement data acquisition. The sensors are resistant to external influences such as oil and dirt, cover very wide temperature ranges and are manufactured to the highest quality standards. We implement customer-specific sensor requirements for you.

LASER SENSOR WITH TEXTILE CABLE
SELAS5

SPEED SENSOR TYPE B
SEFP004-009

SPEED SENSOR TYPE A
SEFP001-003

HIGH TEMPERATURE SENSOR TYPE C
SEHFP004-006



ADVANTAGES:

- ✓ Robust and durable

LASER SENSOR WITH METAL CABLE
SELAS4

4-FOLD SPEED SENSOR TYPE A
SE4FP

HIGH TEMPERATURE SENSOR TYPE B
SEHFP001-003

SPEED SENSOR TYPE C
SEFP010- SEFP015



✓ Temperature-resistant and reliable

SPEED SENSORS

The speed sensors developed by ROTEC are designed for non-contact measurements of the rotational speed of a gear wheel. A ferromagnetic encoder wheel can thus be scanned. The sensors deliver high-quality signals across a broad range of requirements.

TECHNICAL SPECIFICATIONS

Maximum gearwheel frequency	20 kHz (with DSA)
Gearing	- Ferromagnetic target wheel - Module 0,6 to 2,4 - Pitch 1,9 mm to 7,7 mm
Sensing gap	- 0,5 – 2x modul [mm]
Sensor type	Passive, requirement of accompanying electronic unit (DSA)
Impedance/band width (with DSA)	Typ 4,5 kΩ / -3dB at 6 kHz
Temperature range speed sensors	- 15 °C to +100 °C
Temperature range high temperature sensors	-40 °C to +125 °C
Housing	Stainless steel M10x1 outer thread
Pins	- Integrated cable with Lemo 4-pin connector (Type A) - Separate Lemo 4-pol connector to Lemo 3-pol connector (Type B and C)

4-FOLD SPEED SENSOR TYPE A SE4FP

SE4FP, with integrated cable length 2 m,
Thread length 60 mm



4-FOLD SPEED SENSOR TYPE A SENSOR HEAD



4-FOLD SPEED SENSOR TYPE A WITH CABLE

SPEED SENSOR TYPE A SEFP001-003

SEFP001: Thread length 30mm, with integrated cable, length 1 m

SEFP002: Thread length 60 mm, with integrated cable, length 1 m

SEFP003: Thread length 90 mm, with integrated cable, length 1 m

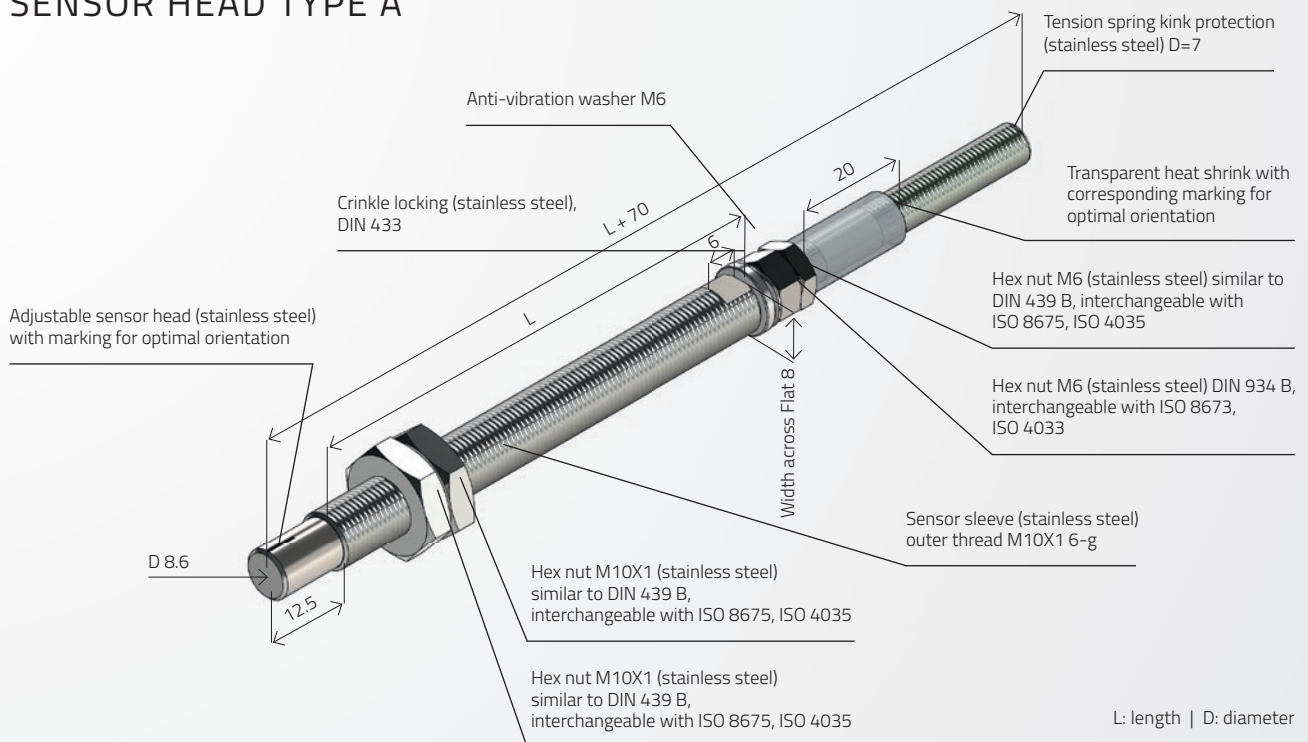


SPEED SENSOR TYPE A SENSOR HEAD



SPEED SENSOR TYPE A WITH CABLE

SENSOR HEAD TYPE A



SPEED SENSOR TYPE B *SEFP004-009*



SPEED SENSOR TYPE B SENSOR HEAD

SEFP004: Thread length 30 mm, cable incl. KAB005a (0°)
SEFP005: Thread length 30 mm, cable incl. KAB005b (90°)
SEFP006: Thread length 60 mm, cable incl. KAB005a (0°)
SEFP007: Thread length 60 mm, cable incl. KAB005b (90°)
SEFP008: Thread length 90 mm, cable incl. KAB005a (0°)
SEFP009: Thread length 90 mm, cable incl. KAB005b (90°)



SPEED SENSOR TYPE B WITH CABLE

HIGH TEMPERATURE SENSOR TYPE B *SEHFP001-003*



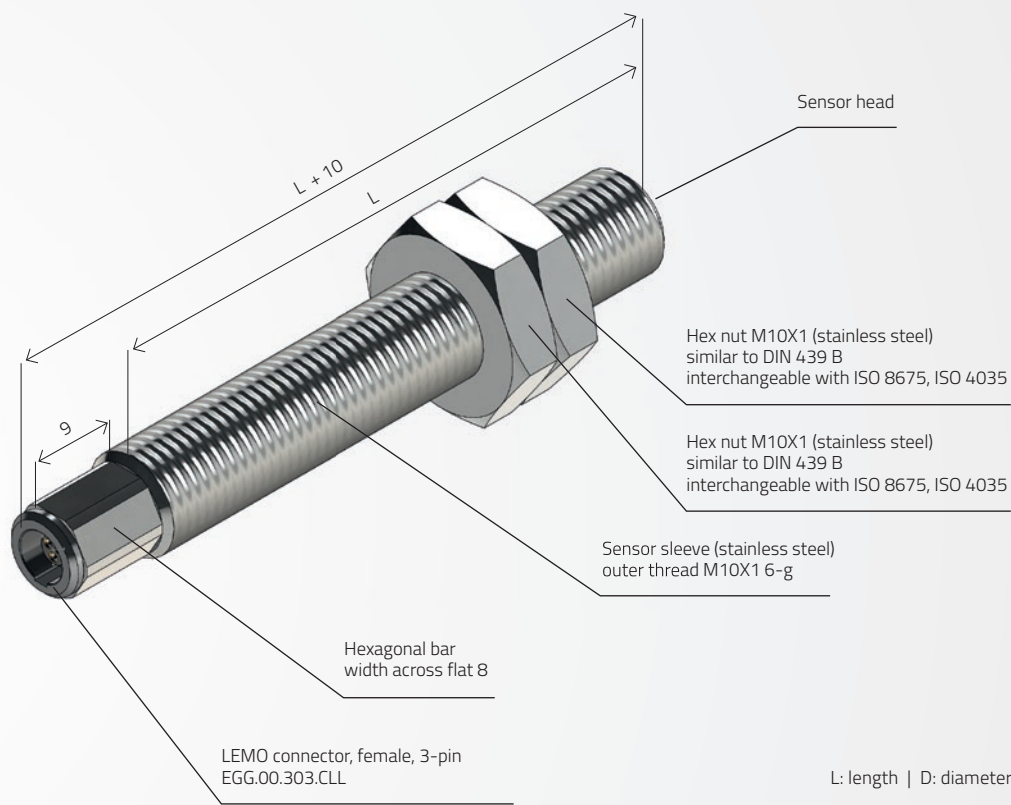
HIGH TEMPERATURE SENSOR TYPE B SENSOR HEAD

SEHFP001: Thread length 30 mm with integrated cable length 2 m
SEHFP002: Thread length 60 mm with integrated cable length 2 m
SEHFP003: Thread length 90 mm with integrated cable length 2 m



HIGH TEMPERATURE SENSOR TYPE B WITH CABLE

SENSOR HEAD TYPE B



SPEED SENSOR TYPE C *SEFP010-015*

SEFP010: Thread length 30 mm, cable incl. KAB005a (0°)
SEFP011: Thread length 30 mm, cable incl. KAB005b (90°)
SEFP012: Thread length 60 mm, cable incl. KAB005a (0°)
SEFP013: Thread length 60 mm, cable incl. KAB005b (90°)
SEFP014: Thread length 90 mm, cable incl. KAB005a (0°)
SEFP015: Thread length 90 mm, cable incl. KAB005b (90°)



SPEED SENSOR TYPE C SENSOR HEAD



SPEED SENSOR TYPE C WITH CABLE

HIGH TEMPERATURE SENSOR TYPE C *SEHFP004-006*

SEHFP004: Thread length 60 mm
SEHFP005: Thread length 90 mm
SEHFP006: Thread length 30 mm

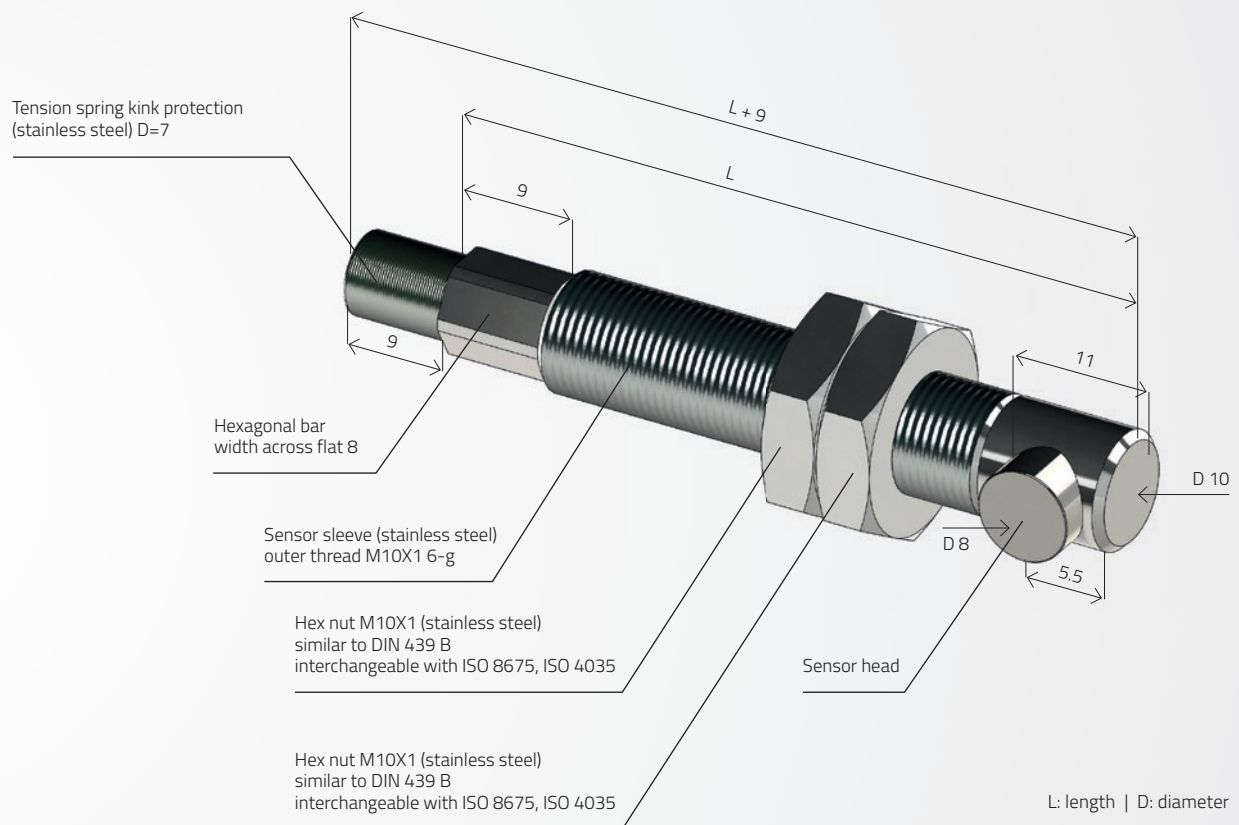


HIGH TEMPERATURE SENSOR TYPE C SENSOR HEAD



HIGH TEMPERATURE SENSOR TYPE C WITH CABLE

SENSOR HEAD TYPE C



LASER SENSORS

You can make speed measurements using the reflex method with our powerful laser cable in combination with the laser tachometer. Depending on requirements, a line disc or a dashed tape is scanned.

TECHNICAL SPECIFICATIONS

Recommended line width	1 mm at 80 mm distance of the laser head
Length of laser cable	5 m
Minimal line width	0,15 mm (under optimal conditions)
Housing	Stainless steel
External thread	M10x1
Accessories	90° mirror

LASER SENSOR WITH METAL CABLE *SELAS4*



LASER SENSOR WITH METAL CABLE SENSOR HEAD



LASER SENSOR WITH METAL CABLE

LASER SENSOR WITH TEXTILE CABLE SELAS5

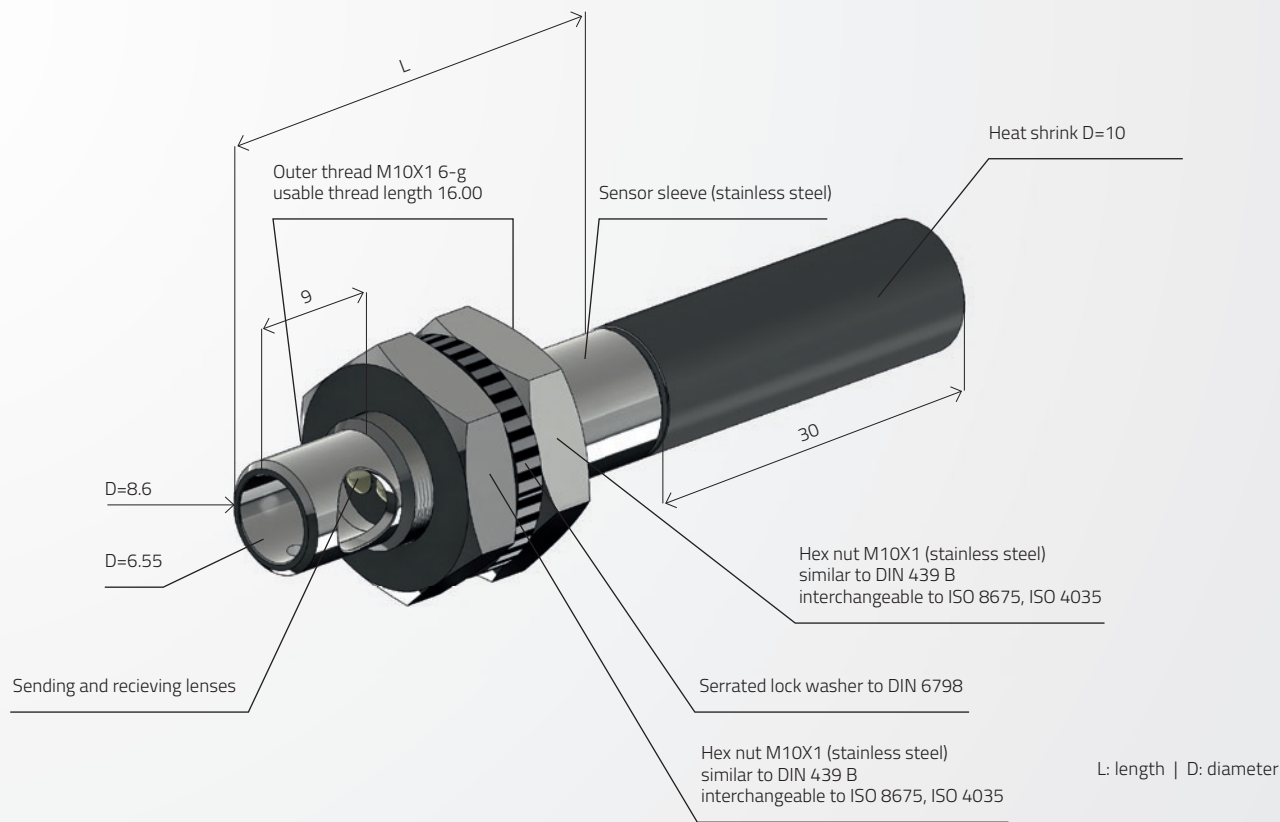


LASER SENSOR WITH TEXTILE CABLE SENSOR HEAD



LASER SENSOR WITH TEXTILE CABLE

LASER SENSOR HEAD



ELECTRONIC UNITS

ROTEC electronics guarantee reliable and accurate amplification and processing of all signals and measured variables. The sensor signals are converted into a TTL signal as an input into the speed board.

PHASE SHIFTER
ELEPS

**DIFFERENTIAL SENSOR
ADAPTER**
ELFP

INLINE TTL DIGTIZER
ELINL1



**ROTATIONAL DIRECTION
ADAPTER**
ELFP4D



ADVANTAGES:

- ✓ Reliable
- ✓ Robust and compact

LASER TACHOMETER
ELLAS2

ROTARY ENCODER ADAPTER
ELDADP2

INLINE DGADP TTL
ELINL2

INLINE DGADP HTL
ELINL3



- ✓ Compatible
- ✓ User friendly

DIFFERENTIAL SENSOR ADAPTER *ELFP*

You can use the high-performance sensor adapter in combination with the speed sensors and the speed board for high-precision speed measurement on gear wheels.



DIFFERENTIAL SENSOR ADAPTER BACK



DIFFERENTIAL SENSOR ADAPTER FRONT

TECHNICAL SPECIFICATIONS

Tooth frequency range	0,1 Hz to 20 kHz
Input	+/- 10 V (4-pol Lemo)
Output	TTL (8-pol Lemo)
Pulse width	10 ns
Minimal sensitivity	5 mV
Operating temperature	-20 to 50 °C

ROTARY ENCODER ADAPTER *ELDGA DP2*

The high-performance rotary encoder adapter can provide information on the angular positions and, if required, direction information. The electronics also offer the option of recording both TTL and 1Vpp (SIN/COS) signals.



ROTARY ENCODER ADAPTER BACK



ROTARY ENCODER ADAPTER FRONT

TECHNICAL SPECIFICATIONS

Maximal encoder input frequency	14 MHz
Input signal	TTL (RS422) or 1Vpp (SIN/COS)
Input	12 pin flange socket
Output	TTL (8-pol Lemo)
Pulse width	24 ns
Operating temperature	-20 to 50 °C

ROTATIONAL DIRECTION ADAPTER *ELFP4D*

The rotational direction adapter is used in combination with the ROTEK 4-fold sensor to detect the direction of rotation of a gearwheel. Complex measurements such as start/stop attempts are thus made possible.



ROTATIONAL DIRECTION ADAPTER BACK



ROTATIONAL DIRECTION ADAPTER FRONT

TECHNICAL SPECIFICATIONS

Tooth frequency range	0,1 Hz to 20 kHz
Use	4-fold sensor
Operating temperature	-20 to 50 °C

LASER TACHOMETER ELLAS2

The laser tachometer reads the optical pattern from a disc's position at any time or from a dashed band by using the reflex method and makes it available as a TTL pulse train. The tachometer also outputs a speed-proportional frequency, similar to the scanning of a gear wheel with a magnetic sensor. To facilitate the positioning of the sensor head, the wavelength is in the visible range so that the position of the measuring spot appears as a red dot. To process different reflection factors, the electronics are equipped with a signal processor which continuously monitors the received light.



LASER TACHOMETER BACK



LASER TACHOMETER FRONT

TECHNICAL SPECIFICATIONS

Line frequency range	0 Hz to 40 kHz (during static Mode)
Laser characteristics	- Laser class 2 - Wave length 650 +/- 10 nm - Laser power <1 mW
Output	TTL (8-pol Lemo)
Pulse width	180 ns
Operating temperature	-20 °C to 50 °C

PHASE SHIFTER

ELEPS

The phase shifter electronics allows users to shift the reference pulse of a rotary encoder by any number of lines within one revolution and thus place it at the desired angular position. In this way, the reference angle can be set, for example, during valve train tests without having to loosen and twist the encoder. Depending on the valve to be measured, the required phase shift is simply set on the Phase Shifter.



PHASE SHIFTER BACK



PHASE SHIFTER FRONT

TECHNICAL SPECIFICATIONS	
Input	TTL (8-pol Lemo)
Output	TTL (8-pol Lemo)
Pulse width	min. 100 ns
Power supply	+9 V - +18 V (nominal: +12 V)
Operating temperature	-20 to 50 °C

INLINE TTL DIGTIZER

ELINL1

You can use the compact Inline TTL digitizer as a measuring amplifier in combination with the speed sensors and the speed measurement card. It is equivalent to the sensor electronics, but its weight and functional range are optimized for mobile measurements.



INLINE TTL DIGTIZER

TECHNICAL SPECIFICATIONS

Tooth frequency range	0,1 Hz to 20 kHz
Input	+/- 50 V (4-pol Lemo)
Output	TTL (8-pol Lemo)
Pulse width	10 ns
Minimal sensitivity	5 mV
Operating temperature	-20 to 50 °C

INLINE DGADP TTL / HTL *ELINL2 / ELINL3*

The Inline DGADP TTL / HTL is a mobile version of our incremental encoder adapter. Its compact design makes it particularly suitable for use in vehicles or on motorcycles. A TTL option and a HTL option are available. Pulses can be measured in forward and reverse direction. The pulse following the reference mark (once per revolution) is always available. The Inline Encoder Adapter (DGADP) is also protected against reverse polarity.



INLINE DGADP HTL



INLINE DGADP TTL

ANALYSIS AND SIMULATION SOFTWARE

Our modular ROTEK software provides you with a user-friendly, flexible and powerful tool for data acquisition, analysis and presentation. The application-oriented user interface guides you through data acquisition and analysis, up to simulation, in a structured way. The proven operating concept enables you to get to meaningful evaluations and data presentation quickly.

VIEW MEASUREMENT DATA IN REAL TIME

You can configure the measurement and evaluation settings and view at all measured values during the measurement with the online display with the ROTEK software.

BENEFIT FROM EXTENSIVE EVALUATION POSSIBILITIES

You can carry out evaluations in a time, angle and spectral domain. All measuring channels have a common time base, which facilitates the reliable multi-channel analysis of speed measuring points, as well as the inclusion of analog measured values on a speed channel.

USE DATA EXCHANGE FORMATS

Import and export modules enable the exchange of data with other programs, so that you can easily import data necessary for the analysis or export measurement data, e.g. in ASCII, binary and MDF3 formats.

EXTEND THE BASIC SOFTWARE WITH MODULES

Building on the ROTEK basic software package, we offer you flexible extension packages/modules, depending on the application and task.

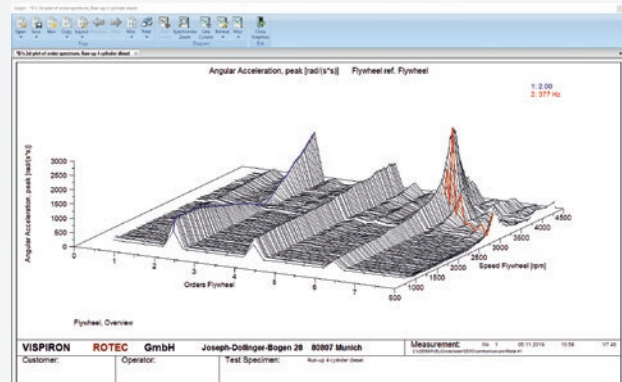
ADVANTAGES:

- ✓ User-friendly and application-oriented
- ✓ Modular
- ✓ Powerful with large evaluation package
- ✓ Compatibility

SOFTWARE MODULES

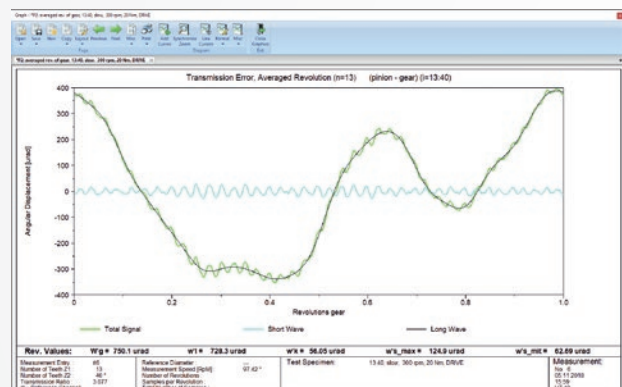
BASIC SOFTWARE *SWBASE7*

The basic package is used to manage the measurement process. In addition, it offers you extensive methods and evaluation options.



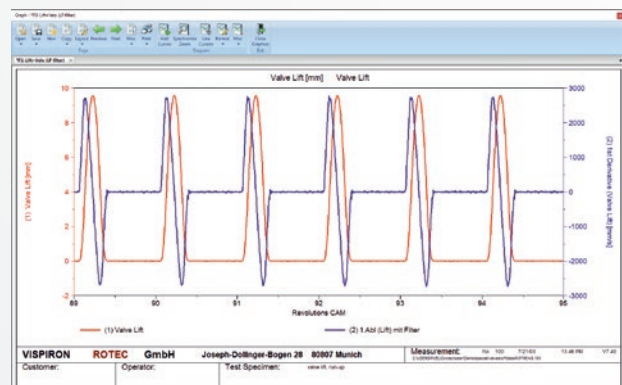
GEAR ANALYSIS / SINGLE FLANK TESTING *SWEFP*

For the analysis of gears, differentials and multi-stage gears, we provide you with a software module for gear analysis and single flank testing (according to DIN3960).



VALVE TRAIN *SWVEN / SWMRSC*

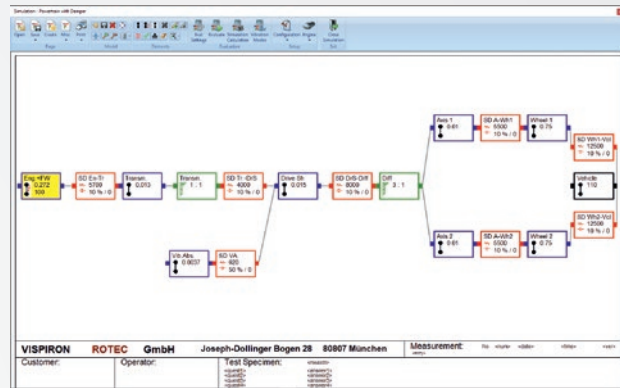
The valve train module offers extensive options for measurement and validation on non-fired valve trains. An add-on module for the measurement of fired valve trains is also available. We provide you with special evaluations for measurements on valve trains, e.g. calculation of valve-seating speed or stroke loss.



SIMULATION

SWSIM

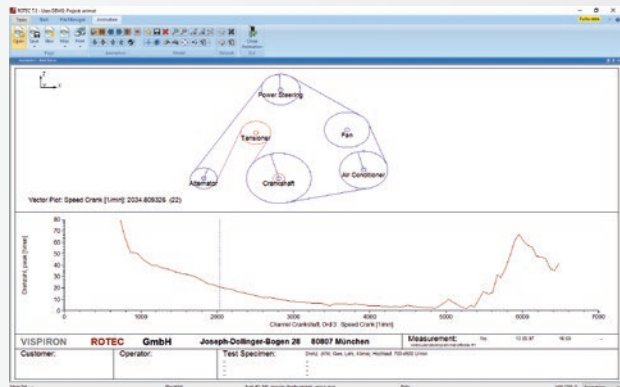
The simulation package facilitates the mathematical description of systems and helps safeguard your boundary conditions in subsequent simulation tools. Stimuli can also be specified manually or read out from measurement data.



ANIMATION

SWANI

The animation module offers you the option of displaying evaluations graphically with the help of dots and line models. Complex interrelationships can be clearly reproduced this way.



DATA IMPORT

SWIMP

The software data import module allows you to import measurement files, while an export function generates ROTECH data for further evaluation, e.g. in Matlab or MDF3 format.

FUNCTIONAL OVERVIEW

ROTEC software is especially user-friendly and well-structured: You can preprocess data to correct measurement data errors, if necessary, with the Synthesis option. After that, analysis follows – the core of the evaluation. Subsequently, you can use Extras to perform postprocessing operations. You can use animations to display the diagrams in your desired layout and then output the results after defining the analysis. You can also transfer the ROTEK diagrams to Office applications and edit them flexibly using the ActiveX copy function.

① SYNTHESIS

DATA PRE-PROCESSING

Module: basic software



② ANALYSIS

DATA ANALYSIS

Module: Basic software, Valve train
Gear analysis / single flank rolling test



③ EXTRAS

DATA POST-PROCESSING

Module: basic software



④ ANIMATION

ILLUSTRATION OF DATA

Module: basic software, animation

SYNTHESES

Using the syntheses functionality, you can preprocess data e.g. for correction or filtering correction:

- ✓ Distance of speed marks
- ✓ Pitch correction
- ✓ Special sensors
- ✓ Filters
- ✓ Level weighting
- ✓ Vector operations
- ✓ DMS rosette
- ✓ Characteristics, analog sensors

ANALYSES

You can perform calculations on speed, analog or CAN signals with the analyses.

TIME DOMAIN

Single and differential channel calculations as curves over time, angle or revolutions.

ANGLE DOMAIN

Single and differential channel calculations as curves over angle, waterfall or 2D-cuts, decomposition of the measurement into cycles of adjustable length.

PITCH ERROR CORRECTION

Determination of the pitch error of an encoder gearing for later correction using a correction-value table.

SPECTRAL DOMAIN

Orders and frequencies. Amplitudes, phases, vector plot and inverse FFT. Peak, Peak-peak, rms, linear, logarithmic, 2D- and 3D-graphs, contour and Campbell representation over time or speed, various types of summation.

OCTAVE FILTER

2D or 3D representation of an octave band filtering.

SPEED SIGNALS:

- speed [1/min], speed fluctuation [1/min]
- Angular velocity [degrees/s, rad/s]
- Vibration angle [degrees, rad]
- Angular acceleration [degrees/s², rad/s²]

ANALOG CHANNELS:

- Analog measured value
- 1st and 2nd derivation
- 1st and 2nd integration

TWO-CHANNEL SPEED EVALUATIONS (DIFFERENTIAL CHANNEL):

- Rotational speed [1/min], speed fluctuation [1/min]
- Angular velocity [degrees/s, rad/s]
- Vibration angle [degrees, rad]
- Angular acceleration [degrees/s², rad/s²]

EXTRAS

You can use extra tools to post-process the results of an analysis. Examples are curve smoothing, statistical analysis and ASCII data conversion.

- ✓ Scaling
- ✓ Statistics for 2D and 3D representation
- ✓ Spectrum up to 16 k lines
- ✓ Filters
- ✓ Smoothing
- ✓ Correlation
- ✓ General formula, calculator for curves
- ✓ Thresholds
- ✓ Data conversion

ACCESSORIES

Need a measurement computer or a transport case? Want a bag or a bumper for the ROTECH system? Our accessories range also includes additional cables. Here is a brief overview:

MEASUREMENT COMPUTER

RASdeltaTB54

The Panasonic-branded ROTECH measurement computer transmits, evaluates, animates and simulates data from the torsional vibration analysis.



MEASUREMENT COMPUTER OPEN



MEASUREMENT COMPUTER CLOSED

CASE

RASdeltaCASE08 / RASdeltaCASE16

This robust transport case is ideal for transportation by train or plane.



CASE FOR RASDELTA 8



CASE FOR RASDELTA 16

BAG

RBAGFE08 / RBAGFE16

The bag is ideal for the short-haul transportation or storing the ROTEK measurement system.



BAG CLOSED



BAG OPEN

BUMPER

RASdeltaBMP08 / RASdeltaBMP16

The bumper serves as a protective cover for the RASdelta 8 and 16. For use in vehicles, for example.



BUMPER FOR RASDELTA 8



BUMPER FOR RASDELTA 16

OBD2 CABLE

RASdeltaOBDCAB2

The OBD 2 cable connects the RASdelta to the OBD 2 diagnostic interface.



CAN CABLE

RASdeltaCANCAB2

The CAN cable connects the RASdelta to the ECU e.g. of a vehicle.



ENGINEERING SERVICES FOR ADVANCED MEASUREMENT TASKS

WE SUPPORT YOU WITH:

CONSULTING

We are happy to advise you on measurement problems, individual requirements and questions about measurement data analysis.

ALL-ROUND CAREFREE PACKAGE

We offer you measurements and analyses in our "all-round carefree package". These can be, for example, development projects: Starting with the idea, instrumentation, measurement and measurement data analysis up to project assessment and evaluation.

INDIVIDUAL DEVELOPMENT AND PRODUCTION

We help you with the assembly and construction of sensor systems and support you in the design, processing and implementation of components. In addition, we calibrate the measurement chain and develop innovative measurement methods, by using non-contact signal transmission of telemetry, for example.

CUSTOMER AND REQUIREMENT- SPECIFIC MEASUREMENTS

Depending on customer requirements, our teams of specialists can carry out investigations and measurements worldwide, ranging from single tasks to complete packages with ROTEK products specially for you.

SPECIAL SENSOR SOLUTIONS

We can help you with the preparation of individual sensor solutions and high-tech measuring methods such as laser optical sensors, MR sensor technology or specific DMS applications, including non-contact signal transmission.

PROFIT FROM OUR COMPETENCE:

- ✓ Powertrain analysis
- ✓ Control drive validation
- ✓ (Fired) Valve train dynamics
- ✓ FEAD/belt drive dynamics
- ✓ Parameter determination for simulation



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Our German sales team is based in Munich. We have built a strong network of sales partners who sell our service portfolio across Europe, North America and Asia to support you worldwide.

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