



BASALT[®]-N2 Tribology Intelligence

Flexibility · Efficiency · Effectiveness

Tribology Intelligence

The new BASALT@-N2 from German manufacturer TETRA is the answer to the emerging requirements of today's tribology research and development. It is developed as a platform with modular functionality, based on TETRA's high precision automation solutions, proprietary sensors and flexible control software. It is the first instrument that offers true modularity and experiment automation. The possibility to execute parallel experiments or combine experiments with automatic characterization, coupled with the high precision, makes BASALT@-N2 your 24/7 assistant in solving your tribological challenges.

Today's **rapidly changing global markets are forcing companies and researchers to shorter their development intervals**, so the success of a company will depend critically on their ability to act and react faster than their competition. High performance products with new properties for special needs must be released in shorter intervals. Economic risks due to limited availability and fluctuating prices of resources are strong motivators to find new materials and production methods. All these global trends require to test materials more efficiently, more reliably and with more precision.

Tribological projects need to be undertaken with higher efficiency than is conventionally done. Furthermore, the availability of newly developed materials, coatings and alloys leads to a larger variability of experiments and the need to work more application-oriented during the development phase. This manifests itself in the requirements to test contacts with flexible geometry, multi-scale force ranges and contact pressures and environmental parameters, with a trend to lower contact pressure testing.

The need to evaluate wear resistance and long term behavior of new materials, leads to a conflict with the pressure to shorten development times. Realistic wear testing often leads to low wear rate which are hard to measure. Conventionally this requires long lab tests. One solution to this conflict is to multiply the time efficiency of test equipment by creating parallel testing (multi-stations) or automate the sequence of testing and wear characterization so the instrument can work independently 24 hours per day.

The *BASALT@-N2* answers these needs, by being modularly configurable (variability of experiments), allowing in-line high resolution wear characterization or doubling testing capacity by parallel test stations. The sequence of testing and characterization can be 100% automated, removing the need for operator interventions. This can easily double or triple your through-put.

Time for test series in the laboratory and for reporting, is limited. Furthermore, often the developers are well-qualified in their field but not tribological experts. Today's researcher or developer must manage and handle a large variety of complex measurement and laboratory equipment. So it is essential that the tribology equipment is easy to setup, program and use. Furthermore, standard test results should be produced automatically and - ultimately - be mailed to your mailbox when the experiment is finished.

The *BASALT@-N2* generates high precision data at 1000 Hz, thus for a long term experiment, easily some gigabytes of data are created. The advantage is, that the researcher can zoom in to any area of interest and maintain high resolution data, however he needs tools to handle such large data sets conveniently. The *BASALT@-N2* is prepared to be expanded with basic and advanced analysis tools for its high volume of test data, allowing the researcher to create overviews or detailed data without effort.

Automatic reports can even be set up to be sent to your mailbox after test completion automatically. There is no more need to go to the lab, to get your data.

Over **20 years competence** in sensors and measurement equipment combined with first class workmanship "Made in Germany" guarantees reliable and reproducible results.

The new BASALT@-N2 completes the BASALT@ Family portfolio with a high precision modular tester that is easily configurable, compact and highly comfortable in use and increases your test result output 3 or 4 fold. Let's say, it's the first intelligent tribometer of the world.

Benefits

Versatile

- Interface designed for intelligent modularity. The machine detects its configuration and preselects possible experiments.
- Wide range of experiment and instrumentation as well as environmental control for a wide variety of experiments.
- Flexible Software: single experiments get combined by a programmable Sequencer. Make a playlist of experiments and run them automatically

Future Proof

- New modules have downward compatible to the base platform
- Workmanship of the highest quality level 'made in Germany'
- 15 years availability of spare parts guaranteed

Precision

- High precision sensors improve repeatability of measurement and control of experiment conditions.
- Highest resolution AND precision of commercially available sensors : 1/10000 typically.

Reliable Values

- Hardware design is optimized for the best static and dynamic stability, minimizing external and internal influences and the system noise
- 1000 Hz recording of unprocessed data (no a-priori filtering or averaging) without time lag.

Cost Efficiency

- Low startup costs, open for later extensions
- Easy to operate by different operators reduces training cost
- Components designed for long life cycle
- Low maintenance and low operational costs

User Friendly

- The BASALT® -N2 functionality has been designed in close cooperation with some key users and customers, to ensure a maximum in intuitive and efficient configuration and operation with highest machine intelligence support.
- Easy sequencer programming
- Remote configuration in LAN network
- Analysis tools availability

Time Saver -Time Multiplier

- All the above features of a future proof High precision machine with automation capabilities and off-line analysis tools ensure that you have the availability of a full time lab assistant, able to perform a complex set of experiments and offer the data and analysis autonomously, working 24 hours per day, 7 days per week
- Compared to standard lab practices, this approach generates 3 to 4 times the amount of reliable test results per day, making the machine an effective TIME MULTIPLIER
- You don't just 'save time', you 'add time'.

Service

- Service Excellence from manufacturer and distribution partners
- Service Partnership with distributors

Features

Property	BASALT [®] -N2
Experiment Motion	Rotation Uni- and Bidirectional Spiral Track Linear reciprocation - Fretting Single pass sliding Constant or accelerating/decelerating
Normal Force	250N maximum Constant – Load ramps
Measurement Force Precision	1/10.000 FS
Force ranges	Nominal 1N, 10N, 100N and 200N available
Environment	Integrated Sensors for Temperature and Humidity Integrated Gas Inlets Integrated Temperature Controller ($\pm 1K$) Different Solutions for heating and cooling in range - 40°C up to 400°C available
Compatible Experiment Standards	Pin-on-disc (ASTM G99) Standard Test Method for Wear Testing with a Pin-on-Disk Apparatus Standard Test Method for Linearly Reciprocating Ball-on-Flat Sliding Wear Reciprocating (ASTM G133) Indentation/ Adhesion

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