



Future of Maintenance

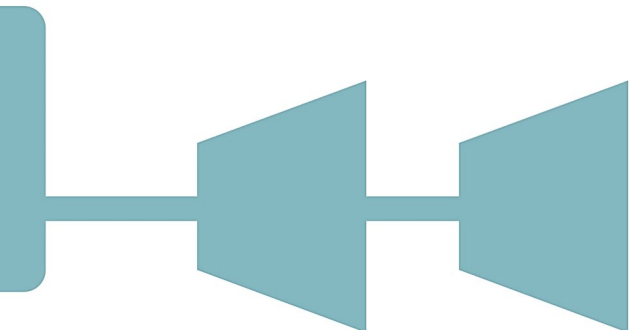
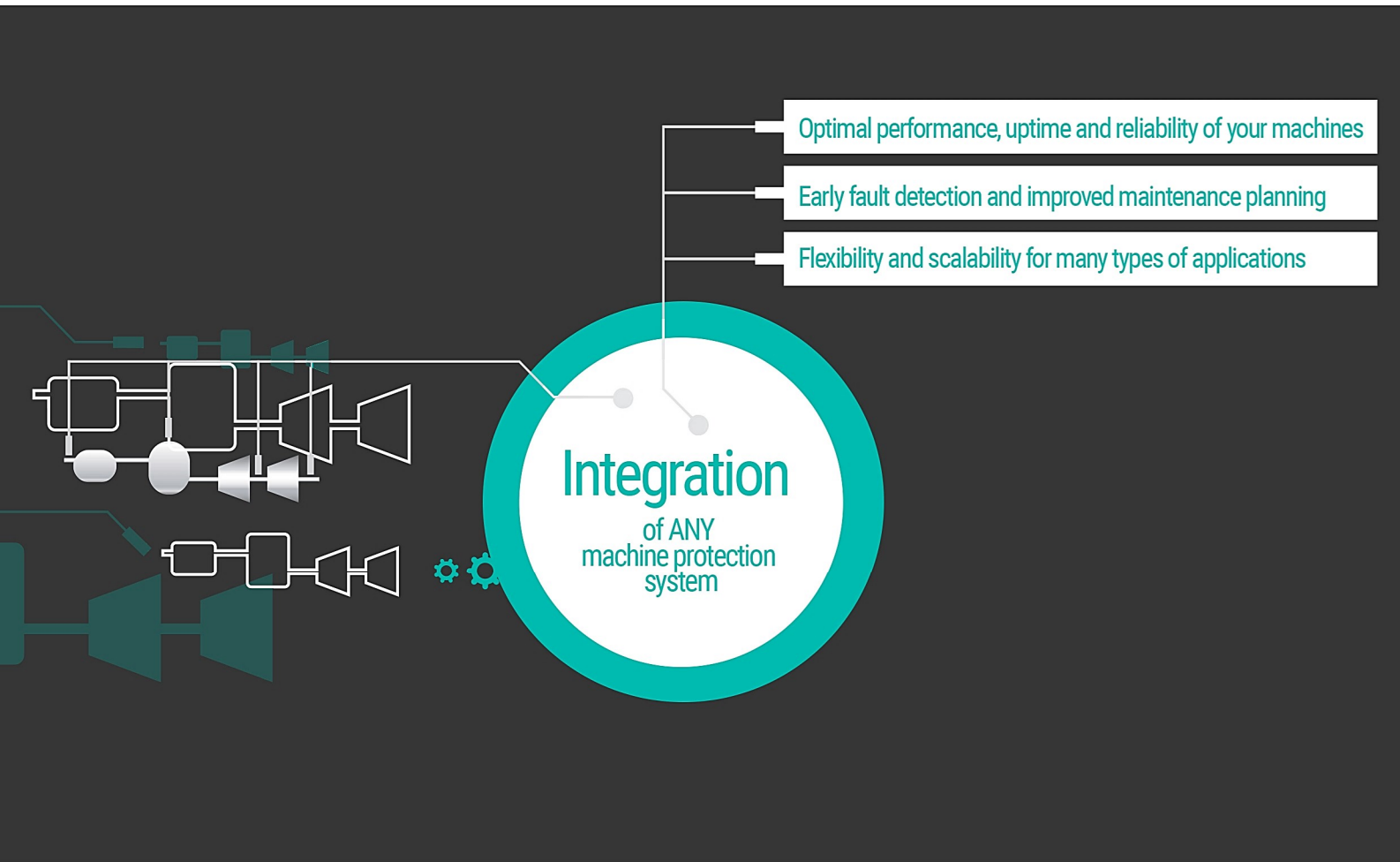
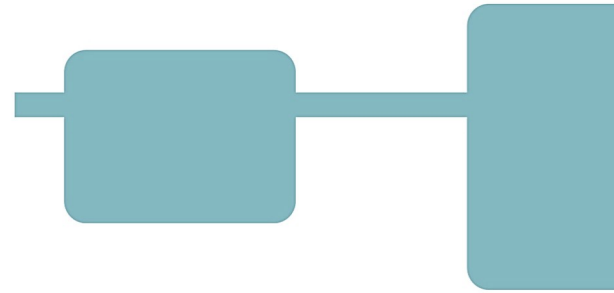


Gubras

Beyond Machine Protection
Plant-Wide Condition Monitoring
and Predictive Maintenance make a difference

Is machine protection enough?

Your machines are protected but there is no protection against losses in uptime or productivity during a shutdown. Is there any way to prevent a shutdown in the first place? Is there a way to get an overview on the health of the machines without jeopardizing the protective function? The answer is yes! Your under-utilized protection system investment can actually help you to better manage your valuable assets ... by simply adding Gubras to it!



Plant-wide online condition monitoring

not only improves machine uptime, productivity, efficiency and reliability, but it also reduces life cycle costs!

With little investment from your side, you can extend your machine protection system to include powerful plant-wide condition monitoring capability. Our monitoring solutions can work on any protection system and be easily extended over a period of time to meet changing customer requirements, such as including performance monitoring and advanced diagnostic and analysis capability. This not only multiplies your ability to more effectively manage your machine assets, but it will also improve the overall plant profitability in your competitive market.

Gubras

The Guardian for Rotating Equipment



Gubras is a state-of-the-art solution for predictive maintenance and condition monitoring of rotating equipment. Gubras was created to cover all condition monitoring needs at the MES level. The modular design allows Gubras to connect to the SCADA and ERP levels through different modules.



Operational
data

Acquire

Process

Analyze



Enhanced
Insight

Technology Cards



Data Acquisition card:
Flexibility in installation of new sensors and gathering data from preinstalled systems.



Fault Detection card:
State-of-the-art fault detection methods utilizing our expert knowledge in design and maintenance of rotary equipment.



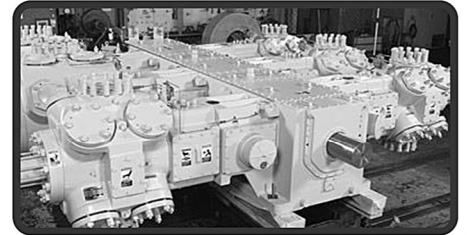
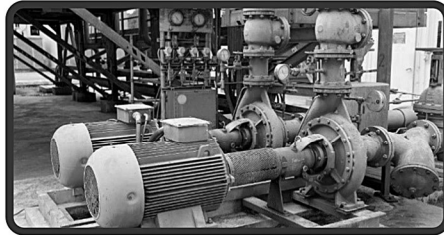
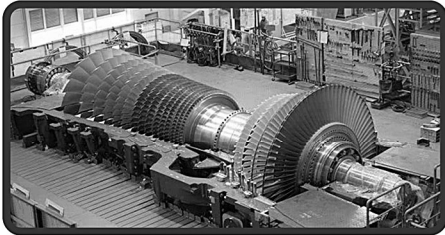
Decision Support card:
Gaining insights through applications of AI and plantwide integrated databases. Connections to other management tools and software.



Cyber Security card:
Security Checklist policy base on ISA/IEC 62443 ISO/IEC 27001

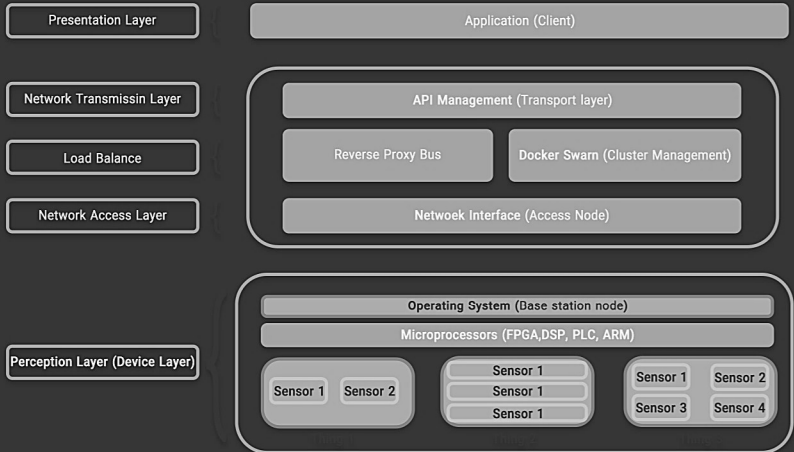
Compressors, Turbines, Pumps, Fans We do it all!

Gubras is the best choice for the monitoring needs of all rotating equipment: turbines, pumps, fans, centrifugal compressors, and reciprocating compressors.



Any connections You Want

Gubras comes with a powerful industrial gateway software that supports multiple data exchange protocols such as OPC UA, TCP/UDP, MQTT, etc.



Already Have a Protection System? No Need to Change Anything!

Gubras can create real-time digital connections to our DAQ system or any other source (DAQ or protection systems, DCS, etc). Gubras can also receive and process real-time data through analog connections to third-party protection systems such as Bently Nevada 3500.



Big Big Data!! As High as It Gets!!

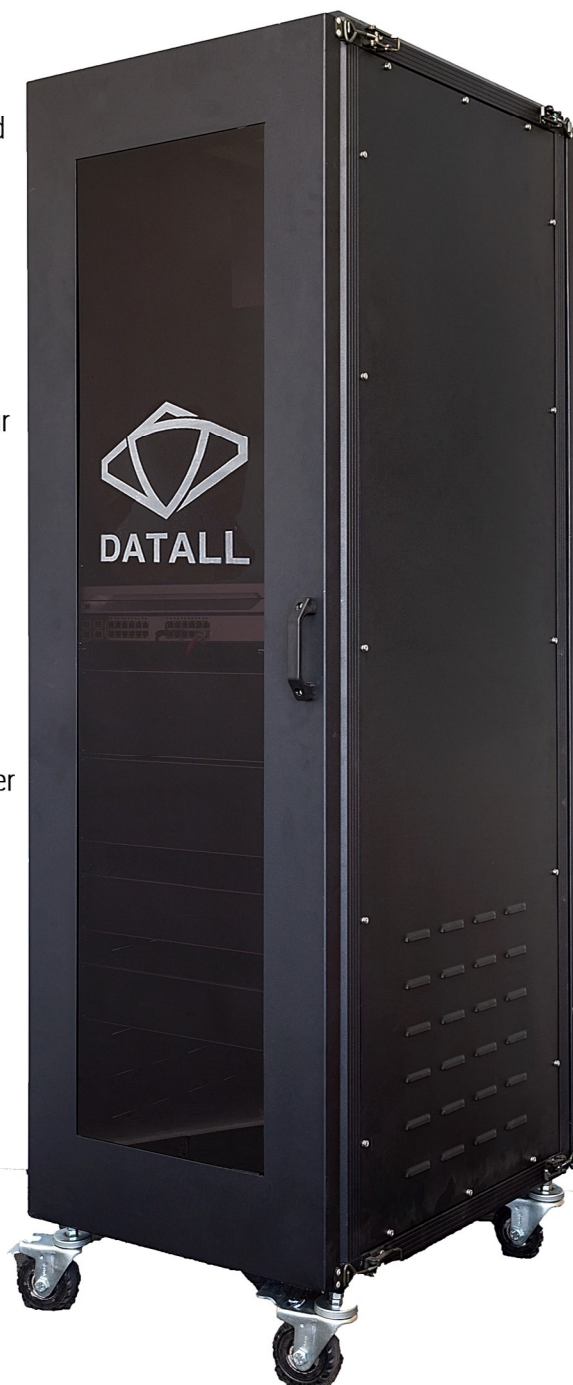
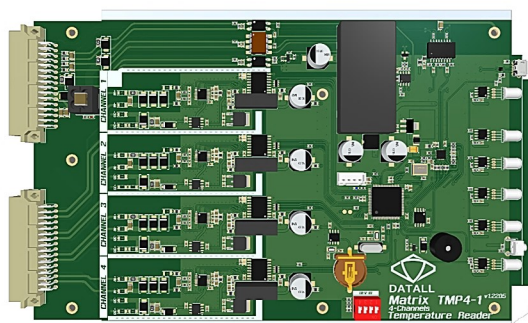
Monitoring rotating equipment requires very high sample rates that lead to big data. Our DAQ system can sample data from sensors up to 3600 samples per cycle, or more than 25 thousand samples per second.

It's All about Security

We use state-of-the-art I/O protocols that guarantee the security of your sensitive data. Following the ISA62443 and ISO27001 standards.

For All your Devices, Big and Small

Gubras can monitor up to 44 sensors per each DAQ assembly. We have a variety of four-channel DAQ cards: some for specific functions, and some that can read data from any 4-20mA or 0-10v sensor. The design allows condition monitoring of smaller equipment with minimum number of DAQ cards.



We Will Be There for You... Literally!!

Our team of experts provide support in the form of periodically analyzing the equipment performance and suggest measures to prevent faults. We also guide customers into diagnosing their equipment and improving the equipment performance.

And You Will Get There Too!

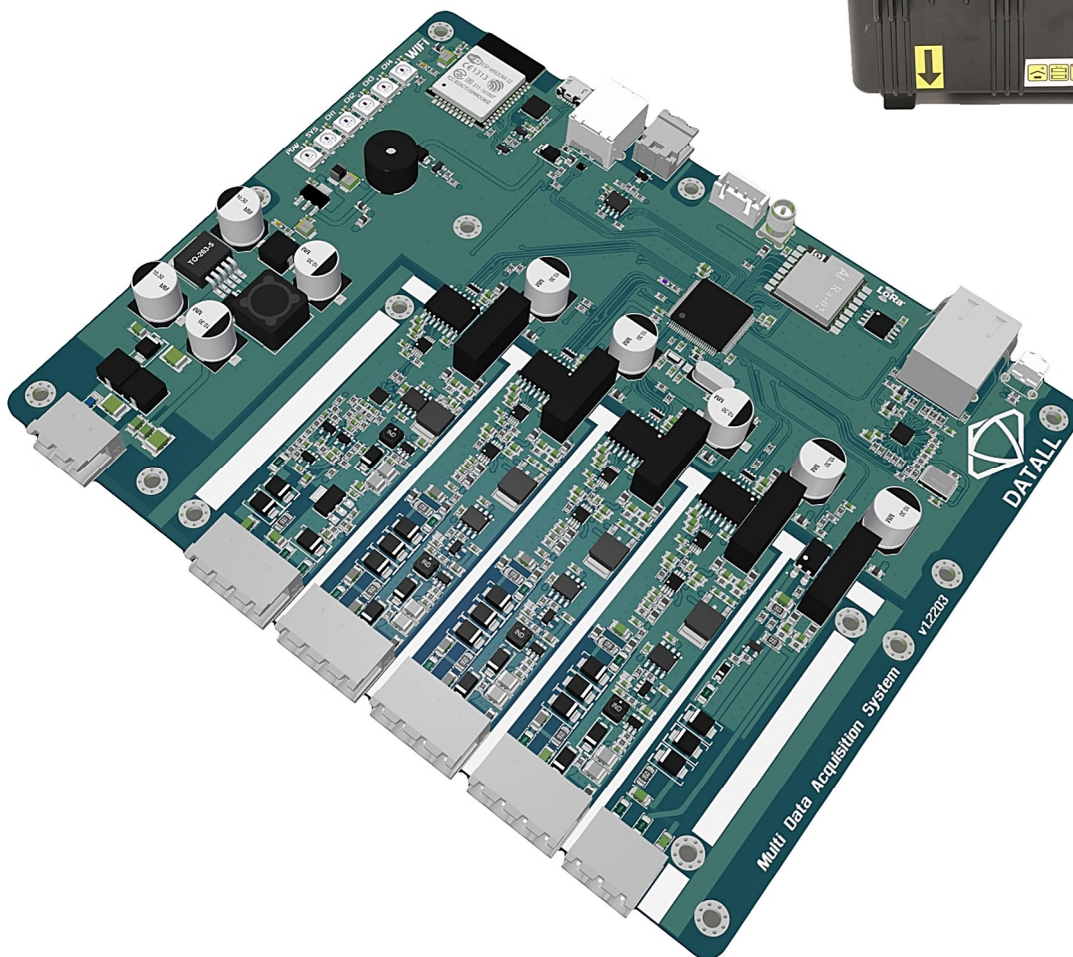
We provide extensive training for your staff. We teach your staff how to work and interact with the Gubras software. We also provide technical courses on how to analyze the parameters, diagnosis messages, and reports generated by Gubras.

Cannot Afford Continuous Monitoring? Did You Know Gubras Has a Portable Diagnostics Solution?!!

Gubras Portable is the ideal solution for diagnostics and fault isolation of smaller equipment or fleet monitoring.

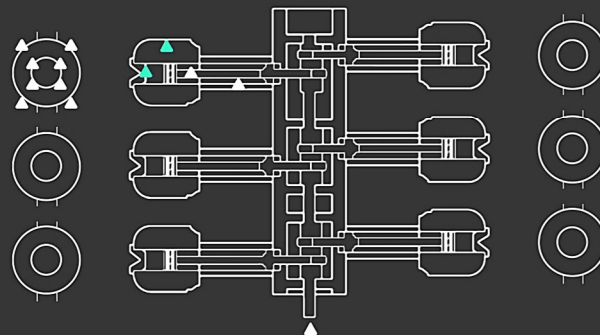
The portable version:

- connects to four sensors simultaneously, two for 4-20mA sensors and two for 0-10v sensors.
- can store data offline or on the cloud for future detailed analysis.
- can connect to the Gubras interface on a wireless device to display real-time charts and basic analysis.

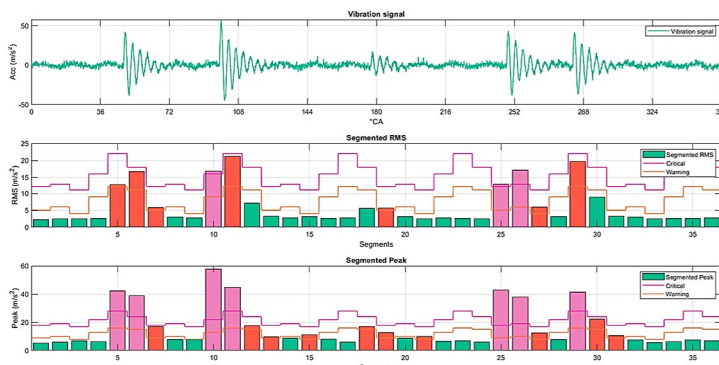
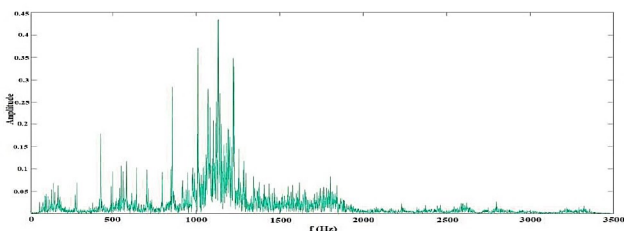


Comprehensive monitoring:

Gubras allows monitoring many different types of measurements including pressure and temperature at different points, vibration at different locations, proximity sensors, as well as oil level sensors. These sets of measurements are sufficient for monitoring any type of rotating equipment.



Alerts: For each equipment, an extensive list of performance parameters are defined and calculated in real-time. Two sets of thresholds can be defined for each parameter. For some parameters, thresholds can vary based on the crank angle.



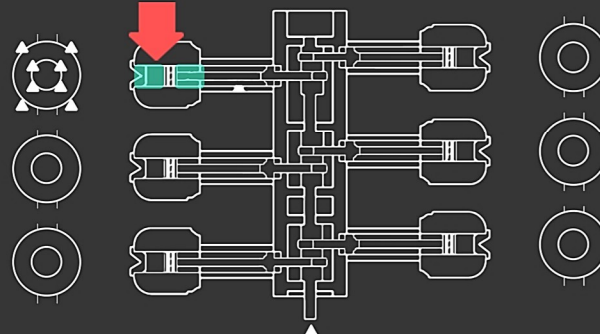
Predictive maintenance:

early detection of a thorough list of faults for each type of equipment is achieved through simultaneous analysis of performance parameter values and fault detection tables.



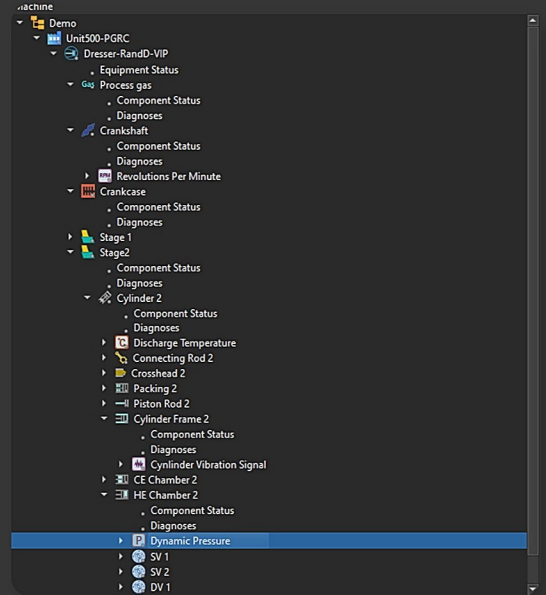
Root cause analysis:

Decision trees are used for fault isolation. The decision trees vary based on the available input measurements, which makes Gubras the highest scalable solution on the market.



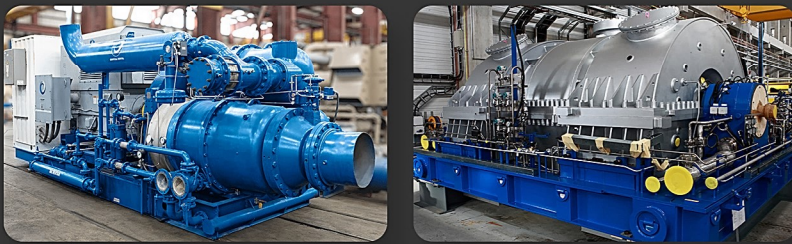
Component model:

Modeling the equipment in a tree structure. The tree structure not only displays the component breakdown, but also displays all parameters, available functions, the status of components, and sensors in the same component hierarchy.



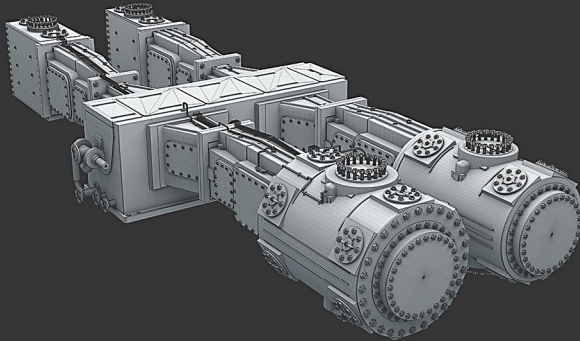
Monitoring multiple equipment:

Multiple equipment can be defined in the tree structure,



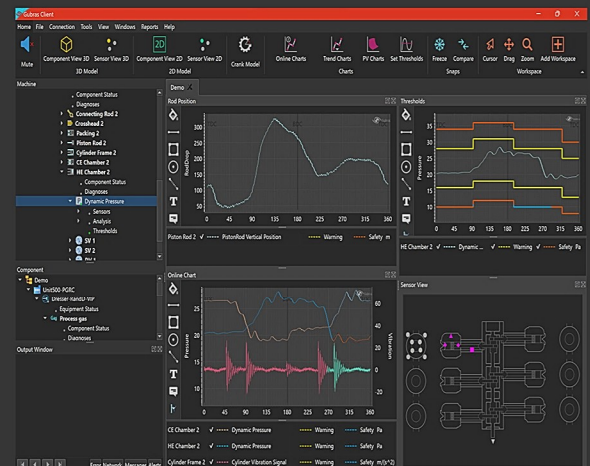
2d and 3d models:

the status of the compressor can be viewed in a glance in our sensor view and component views. The alerts change the color of components and/or sensors on these models.



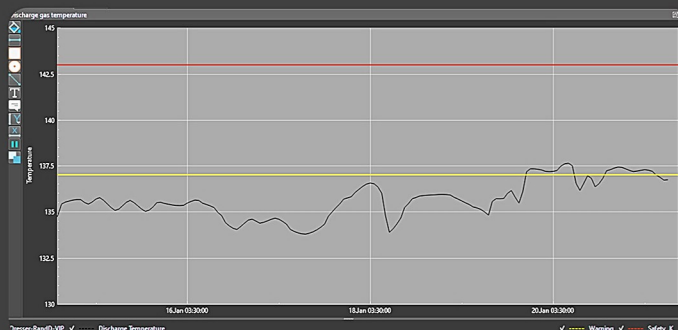
Modern interface:

the interface allows multiple tabbed workspaces. Tabs in each workspace can be resized and moved, so the user can position multiple charts and models. The charts all support displaying multiple parameters and adding parameters to a chart is as easy as dragging and dropping parameters from the tree structure to the chart.



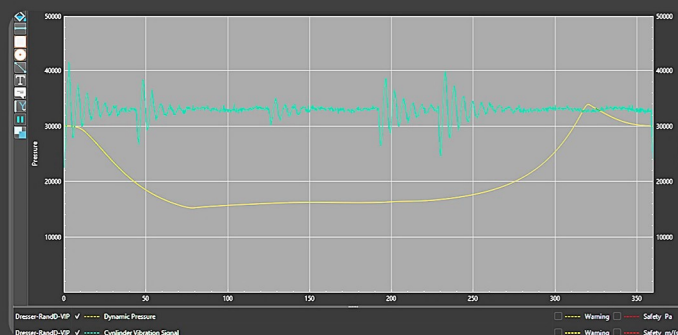
2d trend charts:

Gubras allows users to plot multiple parameters in the trend charts. The trend can extend from seconds to years, and can be updated in real-time. All important events are labeled on the chart and the thresholds for every parameter can be displayed on the chart as well.



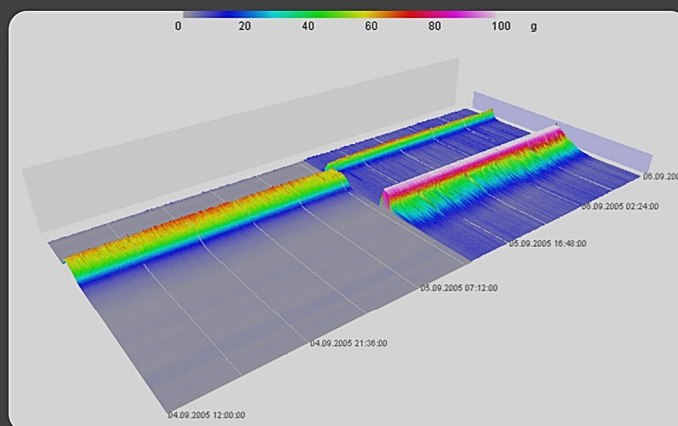
Parameters vs. crank angle charts:

plotting multiple parameters in the crank angle domain helps the user to figure the behavior of the equipment at different points in the cycle.



3d trend charts:

crank angle charts can extend in time to create 3d trend charts. 3d trend charts help the user narrow down the cause of changes in the parameters. The user can easily navigate from the 3d trend chart to a crank angle slice to further investigate the parameter behaviors at different points in time.

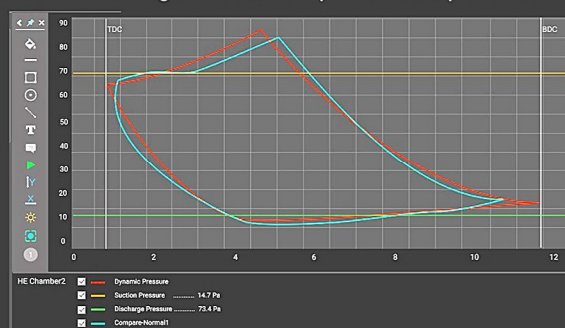


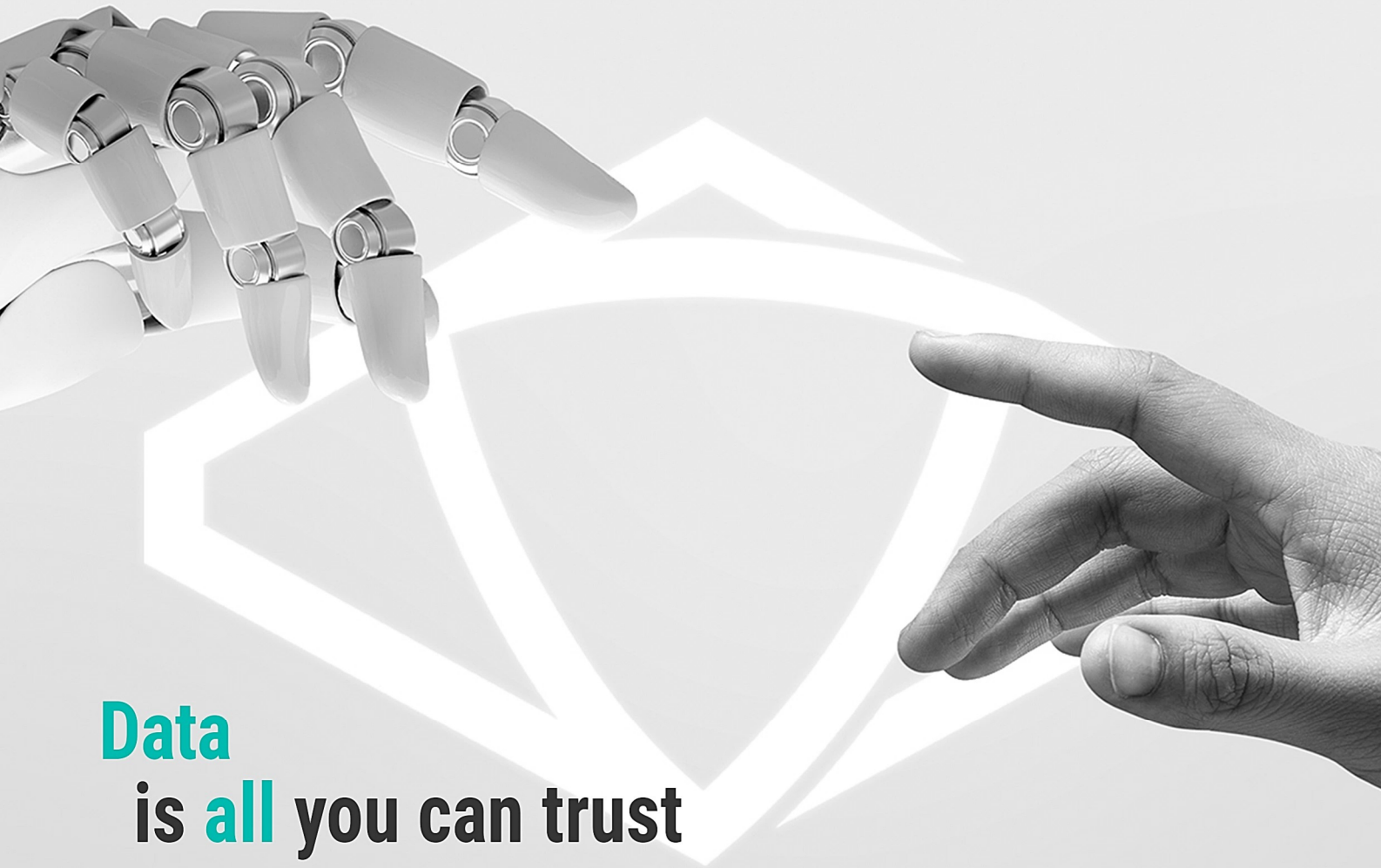
Reciprocating Compressors Solution

All monitoring needs: more than 15 types of measurements defined for reciprocating compressors, including cylinder dynamic pressure, rod drop, frame vibration, crosshead vibration, suction and discharge pressures, and suction and discharge temperatures. The highest accuracy in predictive analysis is achieved through simultaneous monitoring of a large number of dynamic pressure, vibration, and rod drop signals




State-of-the-art fault detection: more than 70 performance parameters are defined in our reciprocating compressor module and calculated in real-time, which form the basis for detecting more than 15 different faults, such as valve leakage, valve fluttering, valve sticking, rider ring wear, looseness, and imbalance. We follow the guidelines of api618 and api670 in all our parameter definitions.

P-V diagrams: our software not only plots the cylinder dynamic pressure against displaced volume, but also detects important points on the plot, such as valve closures and the beginning and end of compression and expansion stages. This helps Gubras to accurately estimate the polytropic exponent at four points, which is crucial in detecting leaks. P-V diagrams can also extend in time to create 3d P-V charts.





Data
is **all** you can trust

 +98 21 66 08 51 81
 +98 21 66 08 51 97
 www.datall.ai
info@datall.ai



Sharif Energy, Water, and
Environment Institute