SAFETY. EFFICIENCY. CONNECTIVITY.

GEISLINGER DIGITAL SOLUTIONS

MONITORING
ANALYTICS
CONNECTIVITY

GEISLINGER®
POWERTRAIN SOLUTIONS. BUILT TO LAST.

DIGITAL WORK-CHAIN
AT GEISLINGER

Geislinger Digital Solutions combine excellent product performance with world-class engineering, providing additional operational safety, reduced cost and optimized performance for your powertrain or even fleet.

Geislinger Digital Solutions are enabled through our digital work-chain containing simulation, engineering and monitoring. Many years of experience with torsional vibration analysis of complex propulsion systems allow us to provide smart solutions for your powertrain.

SIMULATION

Our in-house developed software is used for vibration calculation and is linked with industry standardized CAE software packages to create extensive simulations of the powertrain. The software is constantly improved by our software and simulation engineers and redesigned with new insights generated by artificial intelligence.

Additionally, it is supported and constantly developed by one of the largest competence centers for torsional vibration simulation in the whole industry, the Torsional Vibration Center of Geislinger.
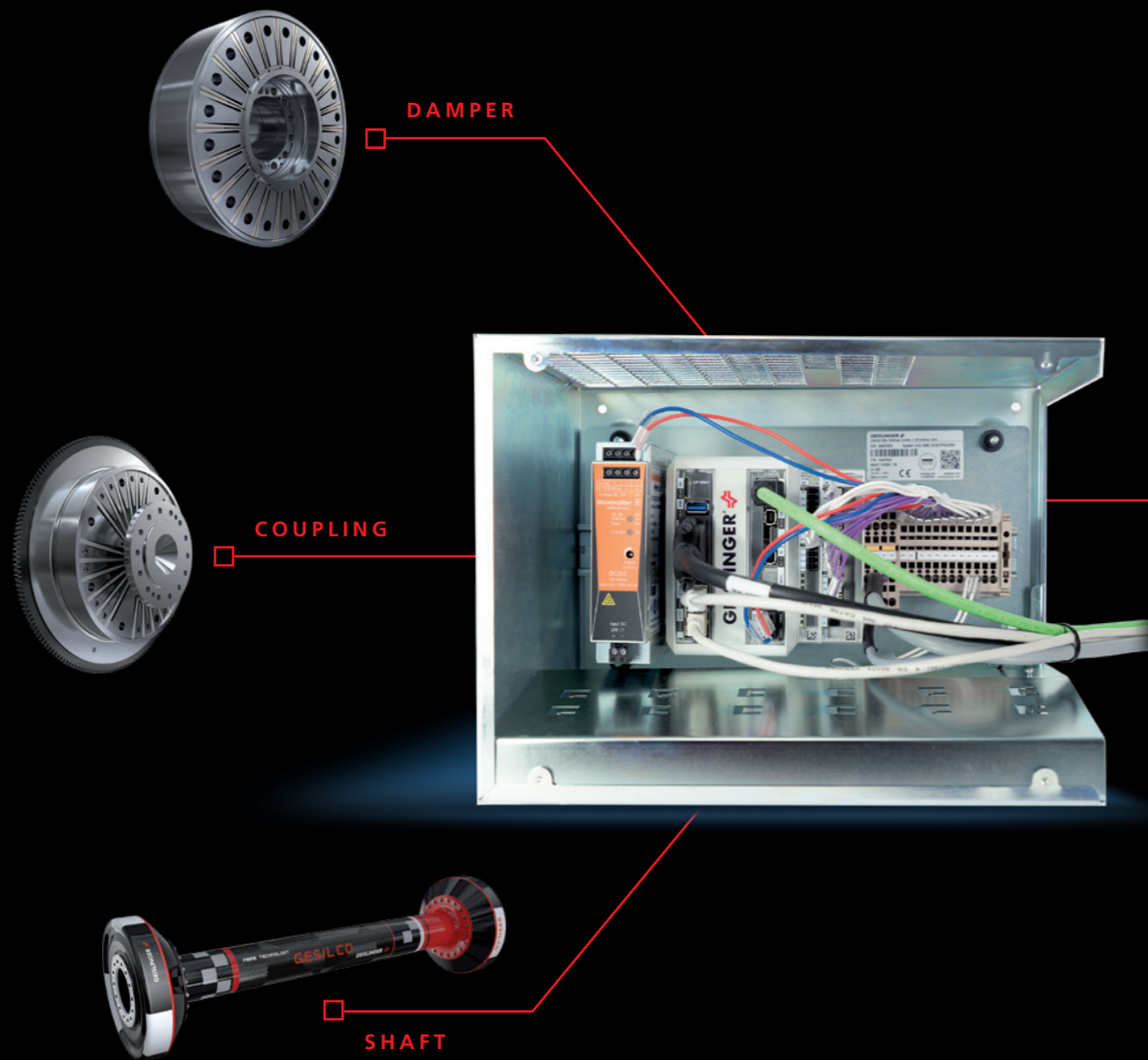
ENGINEERING

Engineering know-how for the whole powertrain enables Geislinger to provide you with a tailor-made solution for your application. With over 60 years' experience in the propulsion of complex drive systems, we provide you with valuable insights for your powertrain.

MONITORING

The permanent measurement of your dynamic system behavior and data push allows for several cloud-based online services, trend analysis, AI supported anomaly detection, fast troubleshooting, data analysis, reporting and predictive maintenance. Monitoring your powertrain allows for maximum safety, can prevent downtime and mitigate the overall operational risk. Moreover, an optimum operation can be determined due to early detection of torsional vibration problems resulting in lower operational costs. Additional power monitoring provides a profound basis for fuel savings and eventually a reduction of CO_2 emissions.

GEISLINGER POWERTRAIN SOLUTIONS.
BUILT TO LAST.

The family-owned Geislinger GmbH is a world market leader for innovative powertrain solutions and BUILT TO LAST products for all kinds of high-performance drivelines.

Geislinger develops and produces torsional vibration dampers, torsional elastic, high-damping couplings, misalignment couplings, composite shaftlines, and torsional vibration monitoring systems for all kinds of high-performance drivelines. Geislinger products are used in sectors such as marine, mining, oil & gas, rail, power generation, wind power, in several industrial fields and in motorsports.

Every Geislinger product is tailor-made and thus perfectly suited to the application it is designed for. Minimal cost of ownership, outstanding service life and a very high level of reliability are the most important features of our products. The corporate slogan "BUILT TO LAST" symbolizes these attributes.

With more than 60 years' experience Geislinger is one of the leading experts in providing solutions to reduce vibrations in powertrains. Research and development plays a major role in the company's philosophy and therefore Geislinger invests a high percentage of its yearly sales revenue in this key segment.

To improve customer service and shorten delivery times, Geislinger locations and partners are based in the main markets worldwide. State-of-the-art machinery and work areas are part of the company's philosophy. The result can be seen in the high quality of Geislinger products and the major role as a reliable and highly competent development partner worldwide.

Geislinger is today being run in the fourth generation and the family-owned company has succeeded in being a market leader for innovative powertrain solutions.

DAMPER

COUPLING

SHAFT

GEISLINGER
MONITORING SYSTEM MK6

ONE HARDWARE SYSTEM – FOR MULTIPLE SOLUTIONS

All monitoring options are possible with the same core hardware.

ONE SYSTEM – FOUR BENEFITS

1. **POWER MONITORING**

- ☐ Measures and monitors static torque and transmitted power
- ☐ Measures the static twist between two rotating tooth rigs mounted on the shaftline and is integrated into the coupling
- ☐ Integrated into the coupling or on shaftline
- ☐ Online calibration

2. **TORSIONAL VIBRATION MONITORING OF DAMPERS AND COUPLINGS**

- ☐ The Geislinger Monitoring System is widely used in conjunction with Geislinger Torsional Vibration Dampers and Torsional Elastic Couplings
- ☐ The main task of the Geislinger Torsional Monitoring System is to monitor the components and recognize functional deviations

3. **VIBRATION STRESS LEVELS IN SHAFT COMPONENTS**

In many propulsion systems, critical intermediate shaft stress can be caused by torsional vibrations which can lead to failures in the main shaft components.

- ☐ Geislinger Monitoring System is designed to detect such overloads in the shaftline
- ☐ Exceeding of IACS UR M68 stress limits triggers an alarm or warning on-site (for the crew)
- ☐ Critical operation conditions that lead to high wear in the components can be identified through continuous Torsional Vibration Monitoring

4. **INSTALLATION**

The Geislinger Group consists of a **global network of subsidiaries and service partners** that provide aftersales services, anywhere, at any time. Our experienced service staff has successfully completed thousands of installations of the previous Mk4 & Mk5 monitoring systems.
Depending on the location of the vessel our service department will coordinate the best and fastest installation by a Geislinger Expert.

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ANALYTICS PLATFORM

The Geislinger Analytics Platform is a cloud-based online monitoring platform for torsional vibrations and permanent measurements allowing for predictive analysis and anomaly detections. It combines big data appliances with Geislinger's vast engineering expertise. You have access to the Geislinger Analytics Platform and the Geislinger Monitoring System via a web-interface from your computer or mobile device. The Geislinger Analytics Platform is entirely hosted by Geislinger and our primary focus lays on guaranteeing maximum data security and assurance as all data flows through our secure domain.

KEY FEATURES OF THE ANALYTICS PLATFORM

TREND ANALYSIS

Due to a continuous monitoring of the application a trend analysis can be made. GMS Mk6 enables us to analyze historical data and look at possible changes over time. The experts in our torsional vibration department can analyze your system and create a predictive maintenance model. This leads to a better service planning, less downtime and less maintenance costs.

ANOMALY DETECTION

For detecting operational anomalies and short-time deviations from the expected performance, the Geislinger Analytics Platform provides an anomaly detection. For this, artificial intelligence models are trained after certain times in operation that continuously compare predicted and real performance data to each other.

AUTONOMOUS OPERATION

The remote access and continuous push of data guarantee maximum safety and supervision. Artificial intelligence can be used for decision-making and keeping the system under remote control.
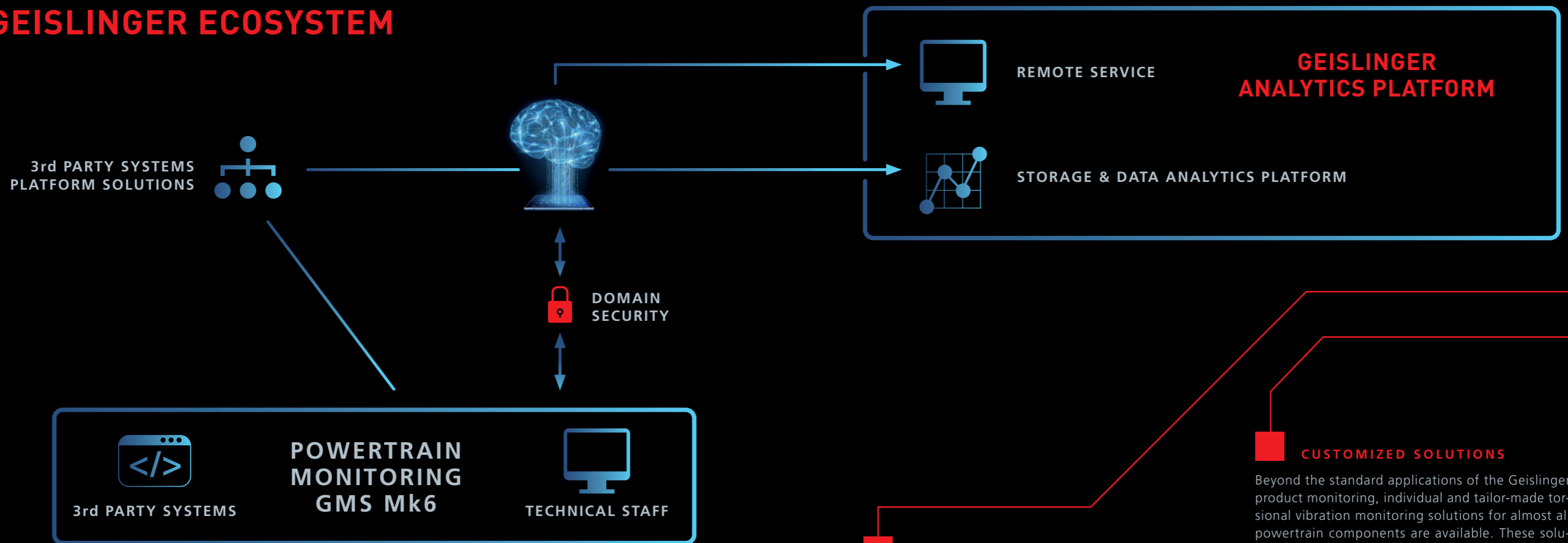
DIGITAL TWIN

Physical parameters can be benchmarked against a simulation from the torsional vibration data to analyze discrepancies that may occur during operation. Additionally, the continuous measurement outcomes and corresponding analysis enrich simulations which allows the Geislinger Service team to give predictive and condition-based maintenance advices.

FLEET MANAGEMENT

Easy and smart fleet management – One look gives you all the information. The interactive overview dashboard enables you to keep control of your complete fleet.
AI supported anomaly detection and the automated notification system enable maximum operational safety, reduced cost and optimal performance.

CONNECTIVITY

The analytics platform coupled with the GMS Mk6 offers a smart solution to blend its data into any platform. Data integration from different sources and data exchange of valuable systems can easily be adapted into the offering of the platform.

SAFETY & SUPPORT

The Analytics Platform establishes a direct line to Geislinger Services for troubleshooting and remote services. The data push to the platform enables us to quickly check your system in case an alarm was triggered on the monitoring system. Experts can access the monitoring and investigate the vibrations curves to support you with valuable insights for better operations. Thus, the downtime of your system is minimized, and the operational risk is reduced.

REPORTING

Based on the gathered data our torsional vibration department can analyze the system and create a report on the condition of the system that can be used for class associations or insurances. Reports provide additional safety, less operational risk and can be used for class association confirmation.

GEISLINGER ECOSYSTEM

3rd PARTY SYSTEMS PLATFORM SOLUTIONS

REMOTE SERVICE

GEISLINGER ANALYTICS PLATFORM

STORAGE & DATA ANALYTICS PLATFORM

DOMAIN SECURITY

3rd PARTY SYSTEMS

POWERTRAIN MONITORING GMS Mk6

TECHNICAL STAFF

The latest GMS Mk6 is the gate opener to the digital world. It can monitor torsional vibrations within the whole powertrain and predict failures through the early detection of abnormal behavior. The connectivity and data gathering in the new GMS Mk6 enables big data analysis and machine learning. 30 years of experience in Vibration Monitoring and more than 60 years' experience in torsional vibration analysis gives us a deep understanding of the system.

GMS POWERTRAIN MONITORING

The Geislinger Monitoring System is a continuous monitoring and measuring system for rotating components of the whole powertrain. It is intended for use in a wide range of applications, such as marine propulsion, power generation, wind power, rail applications, compressors, industrial applications or for test beds.

The GMS is widely used in conjunction with Geislinger torsional vibration dampers and torsional elastic couplings. Its main task is to monitor the components and recognize functional deviations onsite. When safety limits are reached or exceeded, an alarm is triggered. This allows the local user to take appropriate measures to prevent component or system failures.

Moreover, reports can be issued and used as an official service document. It is recognized by classification societies and can also prevent carrying out an overhaul.

CONNECTIVITY

One key feature of the GMS Mk6 generation is its connectivity. The use of the GMS Mk6 makes it possible to send data continuously to the Geislinger Analytics Platform. This data can be used for further system analysis or condition monitoring, using machine learning or statistical analysis combined with expert knowledge.

Different data interfaces and supported bus protocols enable full interconnectivity to connect the GMS with third-party systems, to push data into the Geislinger Analytics Platform or to allow remote access for the Geislinger service team to the GMS Mk6.

The connectivity to other systems allows the combination of different data sources which provides an even better system understanding and enhanced analysis.

For this, analysis results are provided for the operator to set up predictive maintenance and optimize performance.

Moreover, for the technical staff on-site, the use of an operating panel is not mandatory anymore, since it is possible with the GMS Mk6 to get access to the GMS user interface from any device in the local network by a remote desktop connection.

CUSTOMIZED SOLUTIONS

Beyond the standard applications of the Geislinger product monitoring, individual and tailor-made torsional vibration monitoring solutions for almost all powertrain components are available. These solutions are designed according to extensive system analysis by Geislinger's torsional vibration experts together with the wide-ranging engineering know-how in the field of high-performance powertrains at Geislinger.

Customized algorithms filter and calculate static and dynamic twists between the elements as well as the vibratory angle. The calculated torsional vibration values are shown on an intuitive user interface, which can optionally be displayed on an operating panel with touch controls or on an existing computer in the control center.

On the hardware side, there are multiple physical interface options available (see Technical Data chapter) to guarantee a flawless connection to third-party systems. The GMS Mk6 has a modular design and can be customized by adding additional input and output signals, monitoring functionalities or algorithms. Reliable sensors in combination with sturdy measuring gears precisely detect torsional vibrations in couplings, dampers and the entire powertrain.

On the software side, various Ethernet base protocols and experience with several data platforms allow for an easy integration of vibration data into a third-party platform.

TECHNICAL DETAILS

APPLICATIONS

- Geislinger Analytics Platform: Cloud-based online monitoring platform of torsional vibrations and permanent measurements allowing for predictive analysis and anomaly detection.
- Misfiring (free-end) Monitoring: If a cylinder misfires, the alarm signal can be used as a warning to reduce the engine load or to disengage a clutch to avoid excessive vibration levels and further subsequent damage.
- Crankshaft stress or intermediate shaft stress monitoring: Monitoring a critical order range of the vibratory angle at the free end of the crankshaft can be used for detecting dangerous operating conditions for crankshafts or other driveline components.
- Damper Monitoring: Monitoring the damper twist ensures trouble-free operation of Geislinger Dampers.
- Coupling Monitoring: Static and dynamic twists are calculated; both the power transmitted and torque are displayed.
- Power Monitoring: Engine output and shaftline vibrations are displayed to optimize fuel consumption and increase the propulsion safety level.
- Oil Pressure and Temperature Monitoring: Sensors inside the Geislinger oil supply are available as an option for 2-stroke applications.
- Multiple Product Monitoring: Multiple Geislinger products can be monitored on one or up to 4 engines.

ADVANTAGES

- Additional operational safety, low running costs, increased service life due to problems being detected early
- Reduction of unplanned downtimes and thus significant cost savings
- Simple monitoring of torsional vibrations
- Modular design, easily expandable
- High level of connectivity, for integration into the ship's network or existing AMS
- Cloud-based online monitoring of torsional vibrations and permanent measurements due to the access to the Geislinger Analytics Platform
- Automated data acquisition and corresponding data analysis: Switch from periodic to condition-based maintenance
- Geislinger Worldwide After Sales Service

TECHNICAL DATA

- Self-monitoring system unit with a malfunction alarm
- System Unit (IP20), Junction Box (IP65), Operator Panel (front IP65, back IP20)
- Electrical and environmental testing according to IACS E-10 rules and type approval from DNV GL
- 24 V DC power supply, overvoltage protection
- State-of-the-art connectivity options

SYSTEM UNIT

- Physical interfaces: 1x USB 3.0 for data acquisition, 1x EtherCAT, 2x Gbit Ethernet for ship network integration, Micro SD, 1x DVI, 1x CAN, 1x RS 232/422/485
- Supported Ethernet-based protocols: Modbus TCP, OPC UA
  Additional protocols are available on request
- 6 potential-free relay switches for alarm output (4 x opener and 2 closers)
- 4 analogue output (4-20 mA), resolution 12 bit (1x Buzzer connected)
- Maximum operating temperatures: 55°C
- 24 V DC power supply, overvoltage protection

JUNCTION BOX

- Maximum operating temperatures: 70°C
- 4 digital inputs
- 4 analog inputs
- Temperature measurement unit: 4 inputs, supported resistance sensor types NTC, PT 100, PT 1000, NI 100, NI 1000

OPERATING PANEL (OPTIONAL)

- TFT-Display with touchscreen (7" TFT-LCD, 1.024 x 600 Pixel)
- Maximum operating temperatures: 55°C
- 24 V DC power supply
- DVI / RFB
- Height: 135 mm, Width: 200 mm, Depth: 27 mm, Weight: 1.1 kg

SENSORS

- Temperature sensors (PT100)
- Pressure sensors (4-20 mA)

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A GLOBAL NETWORK
PLEASE VISIT OUR WEBSITE TO LEARN MORE ABOUT OUR GLOBAL NETWORK.

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