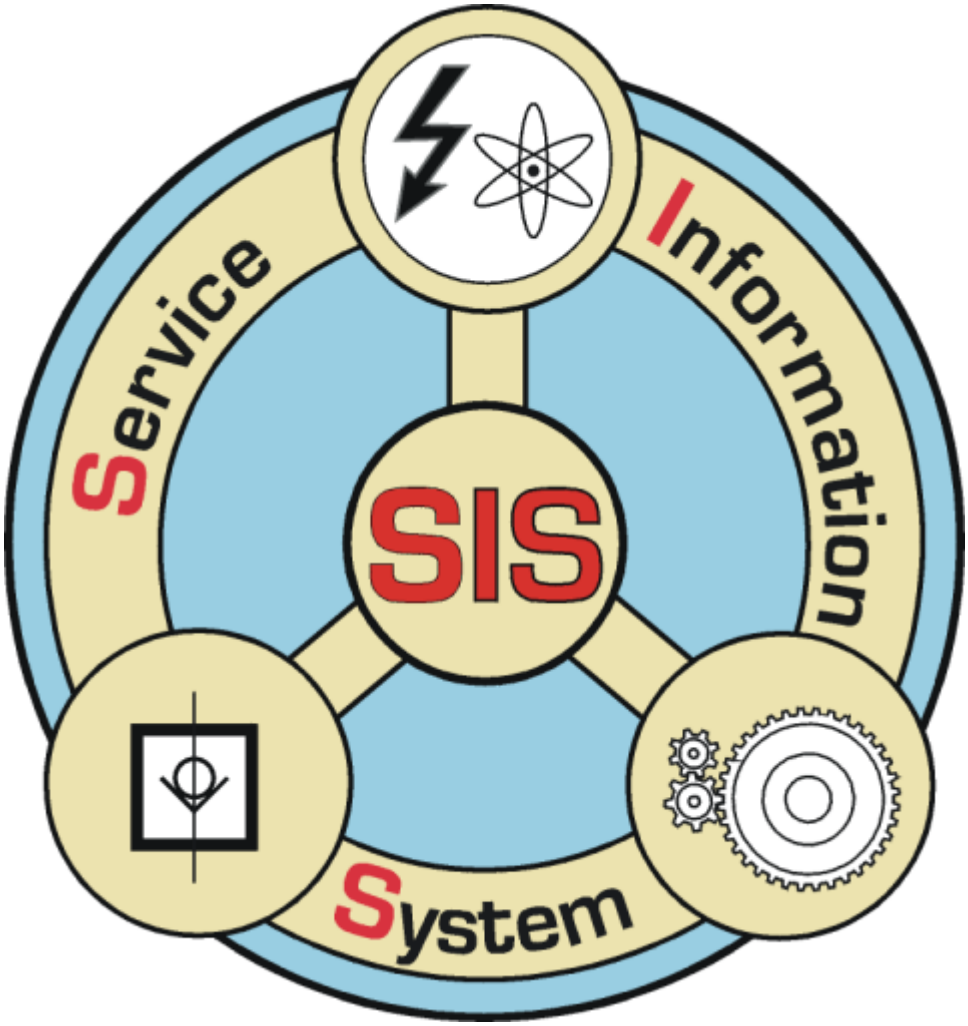
S I S

Service Information System



POLO KNOW-HOW
Industrie-Engineering GmbH

Introduction

Reliability, maintainability and availability of lifting gears under the conditions of high performance and low costs is a target in almost every terminal. The Service Information System (SIS), originally developed for all kinds of cranes but also able to serve other equipment is designed to assist the personnel to achieve this target.

For optimum utilisation of capital-intensive transportation facilities as well as to minimise vessel service time and to cater for the need for rapid and reliable data transfer between the equipment and a control or remote service station, the SIS was developed to serve the entire chain of transportation in the plant. The SIS is easily adaptable to the specific requirements of each operating site.

The SIS receives the data from the PLC of the crane and transmits information to the PLC. It consists of several main modules that processes the transferred information. Each of the modules can work independently. Access to the modules is protected by password.

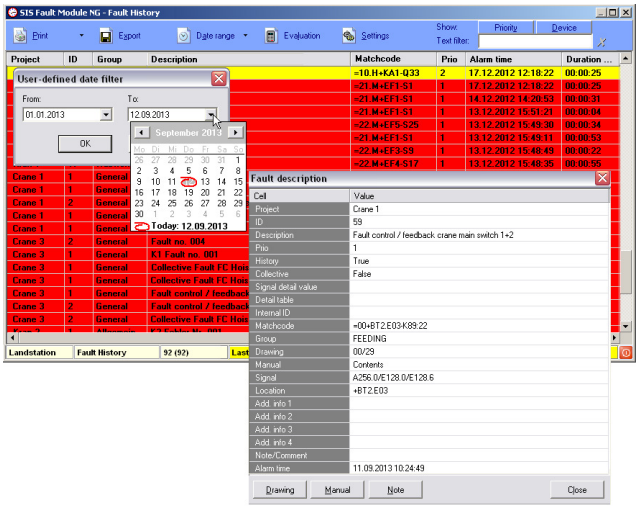
Different tasks or modules can run in parallel on Microsoft Window basis. Changing from one task or module to one another is effected simply by pressing a key combination. Function keys and buttons are arranged in a manner to give the user quick access to the relevant data and to allow easy system handling. Circuit diagrams can be called up on the screen and be printed out on request.

Features of the SIS System

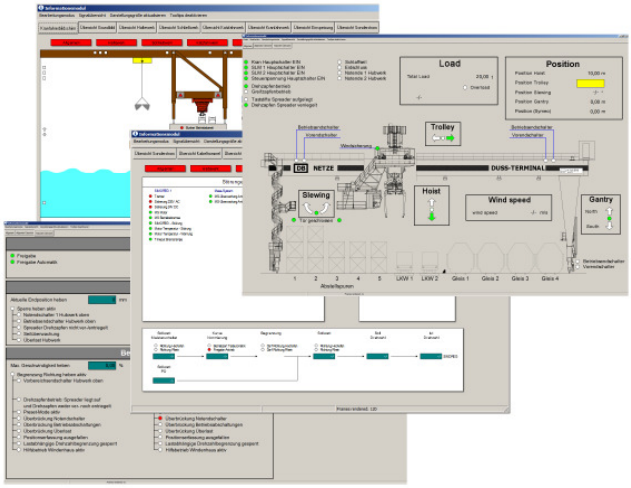
- **C**rane **M**anagement and Visualization **S**ystem (CMS) with modular structure.
- Connectable to all major PLC types through OPC interface.
- Fault monitoring and analyzing.
- Operation and process information visualization.
- Data logging and statistic evaluations included.
- Post Mortem analysis available.
- On-line and off-line working modes.
- Password protection.
- Network capabilities.

Overview of SIS Modules

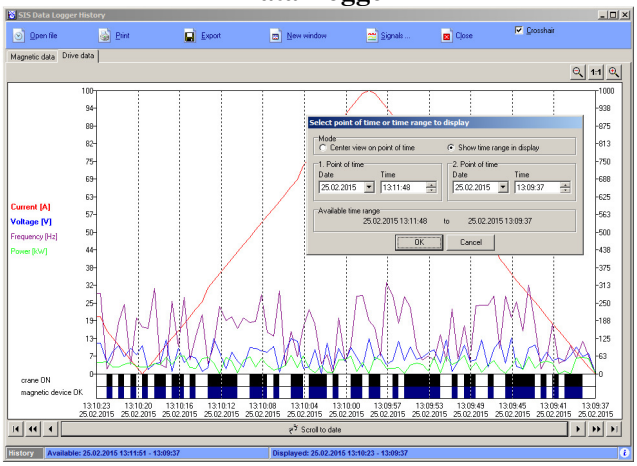
Fault Module



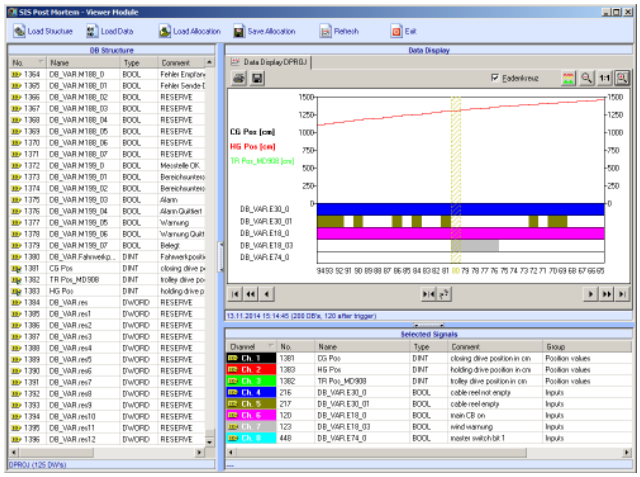
Information Module



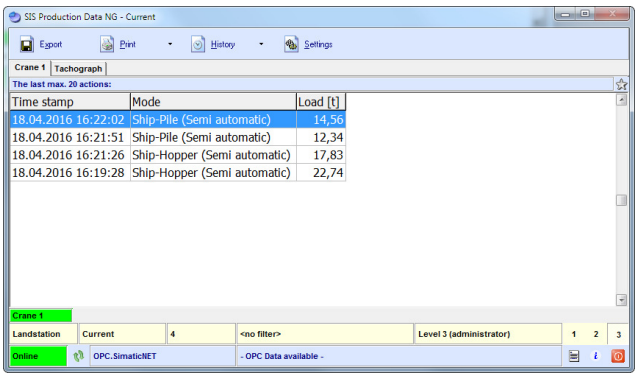
Data Logger



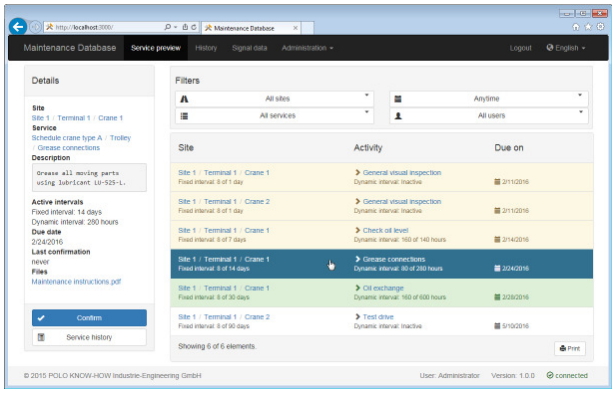
Post Mortem



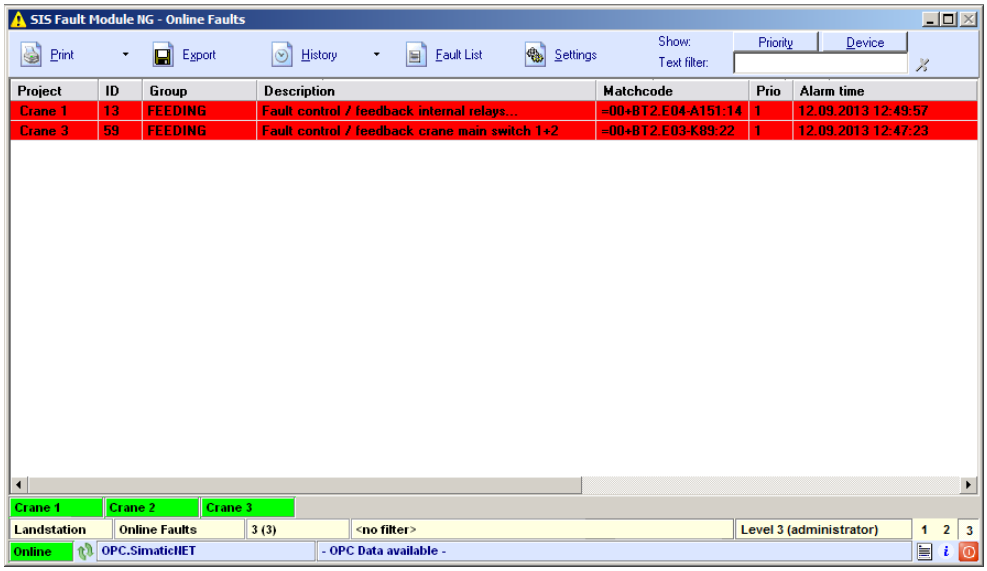
Production Data



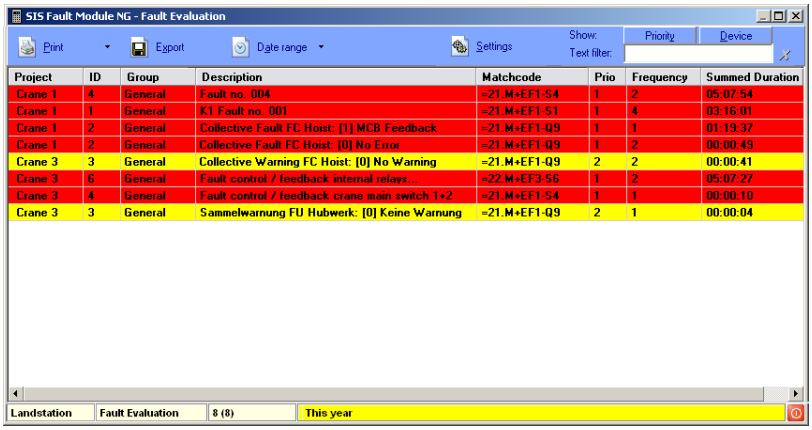
Maintenance Database



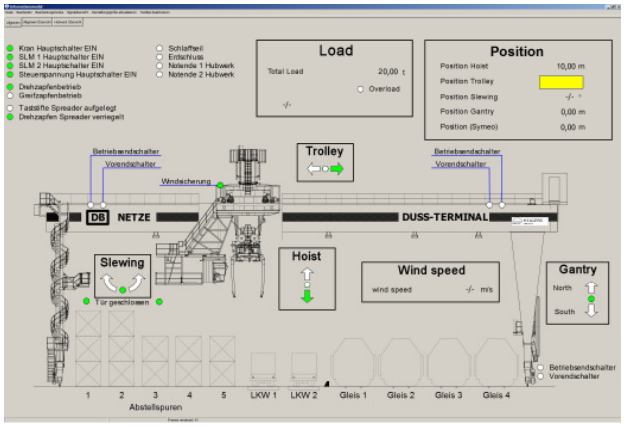
Features of the SIS Fault Module

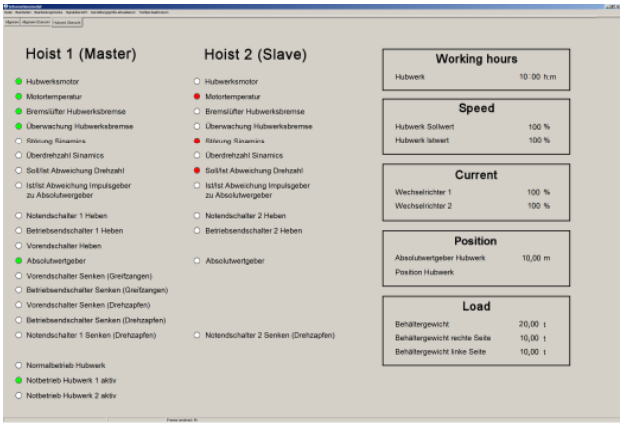


- On-line fault and analysis system to reduce downtime due to immediate information.
- Display and recording of faults, states and events.
- Detail information on specific alarms can also be displayed, f. E. the value of current wind speed in addition to a general wind warning message.
- Collective faults display (general fault message with detail fault code and code explanation)
- Extensive filter and sorting options.
- User-defined help texts on fault removal can be added.
- Manual and drawing retrieval.
- All messages can be saved to history files.
- History files can be analysed (frequency and duration)

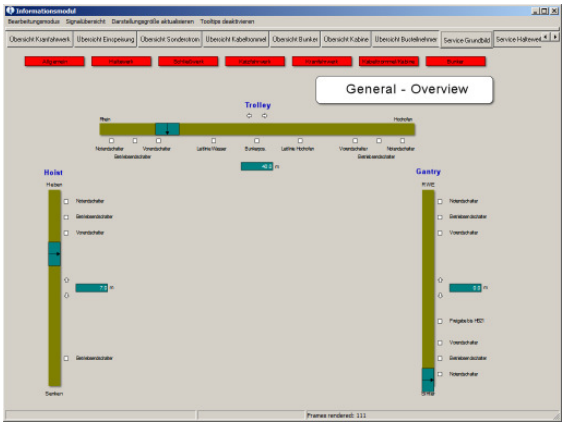


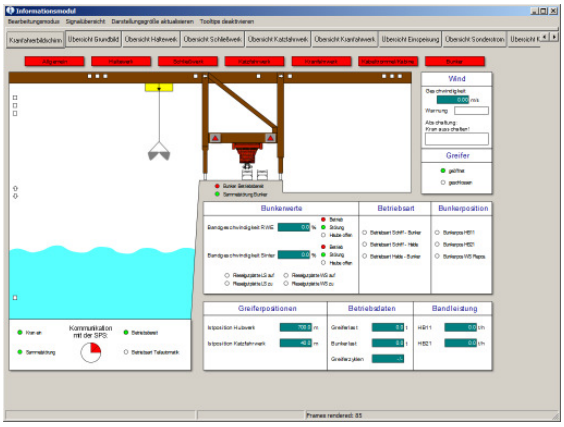
Features of the SIS Information Module



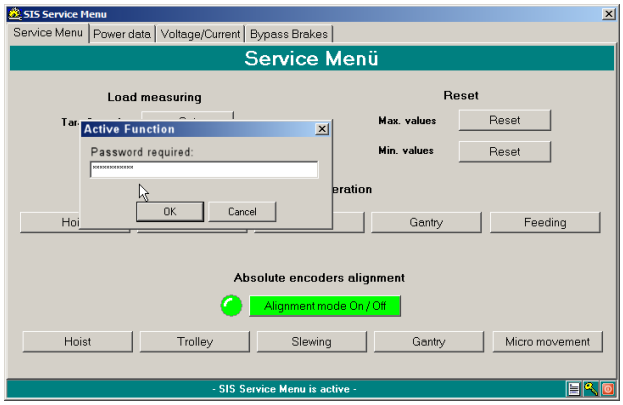


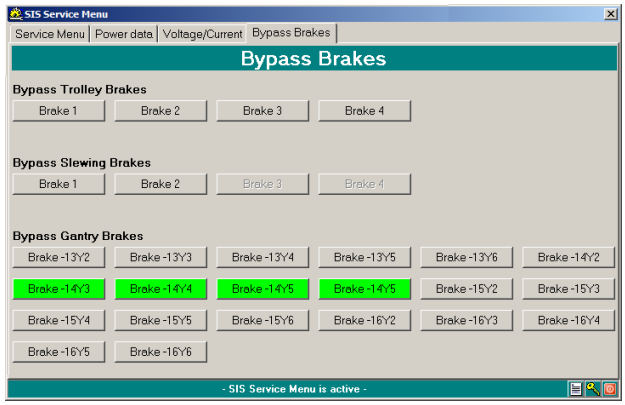
- Quick and reliable on-line information on operation, equipment and process data.
- Instrumentation, monitoring and control functions (on request).
- Displays are arranged in several windows depending on their function. Easy navigation is ensured through button bar and hotkeys.
- Standard indications for working hours of main drives, operation-, production-, crane-on- and idle-time, container-, grab- and cargo cycles, etc.
- All relevant PLC data can be displayed using graphical indication like value indications, meters, bars, LED's, status images etc.
- Use of vector graphics enables free scaling of display
- Tooltips for signal source indication available
- Scaling of signal values and creation of own internal variables (links).
- Customized screens for further application are available.



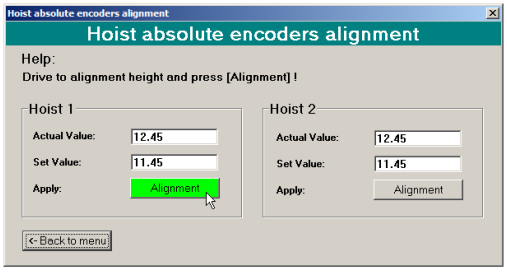


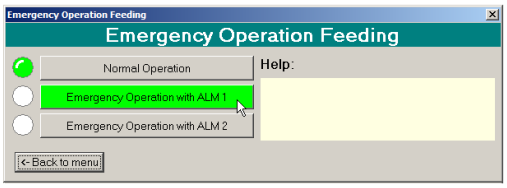
Special indications and control functions

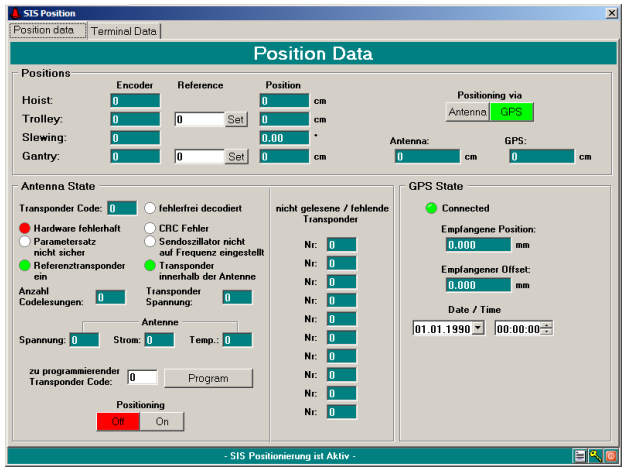




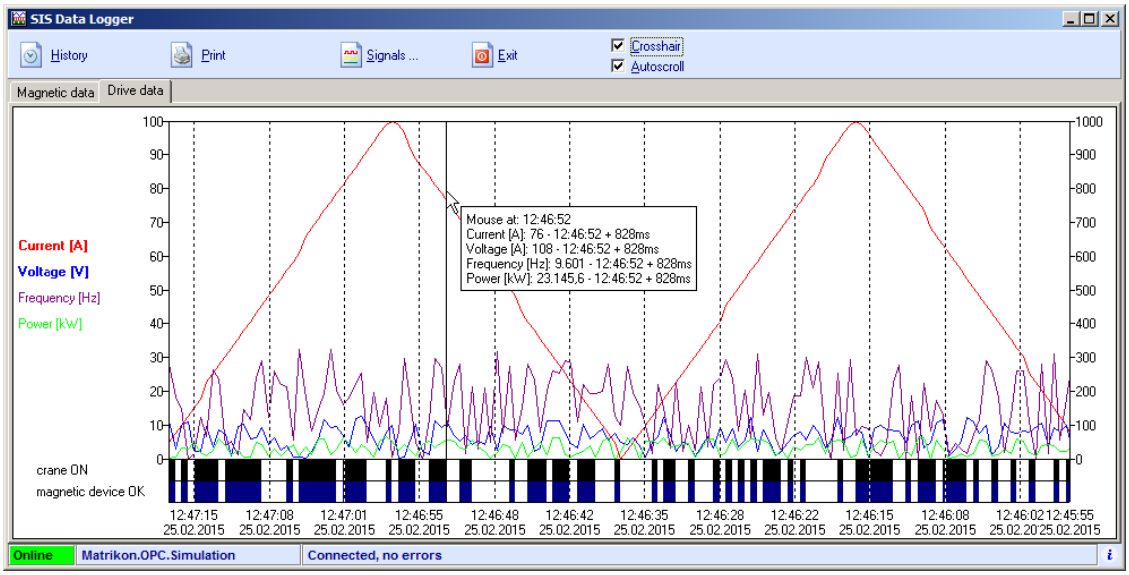
- SIS Service Menu application is an extension to the Information Module.
- Special display and control solutions available on customer demand.
- Set or unset values, trigger functions with pulse signal or simply toggle values.
- Password protection for active functions.
- Examples of application:
  - Absolute encoders adjustment for the available drives
  - Selection of emergency operation modes
  - Setting of tare for load measuring device
  - Reset of counters
  - Bypassing defective parts
  - Control of GPS positioning system



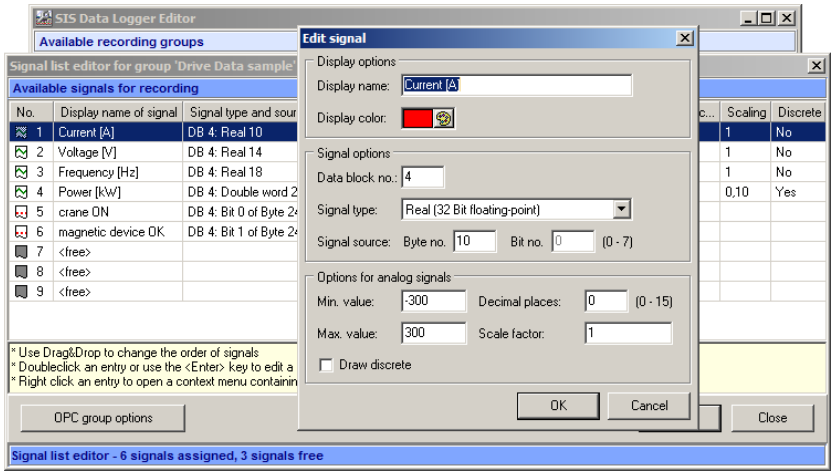




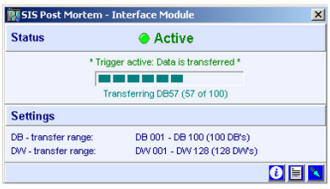
Features of SIS Data Logger

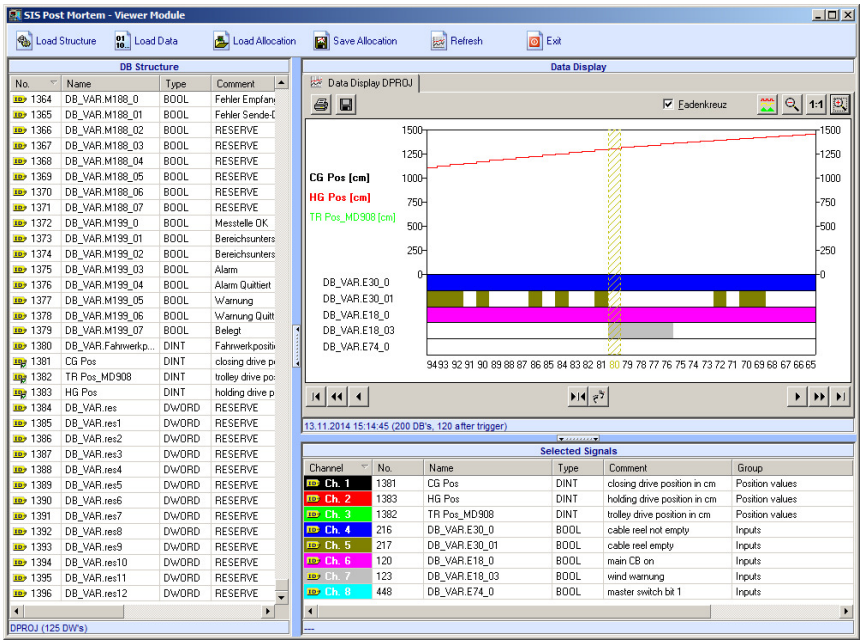


- On-line tracing of PLC signals plotted against the time axis.
- Several user-defined group displays available through tab sheets.
- Up to nine PLC signals (digital or analogue) can be displayed in each group.
- Selection of two axis, vertical zoom and scrolling functions.
- Customized trend definitions for further application are available.
- Monitored signal values are stored to history files.
- History files can be viewed, printed and exported.
- Display of history files also available without connection to PLC (offline mode).
- Easy to use editor for creating and editing custom groups.



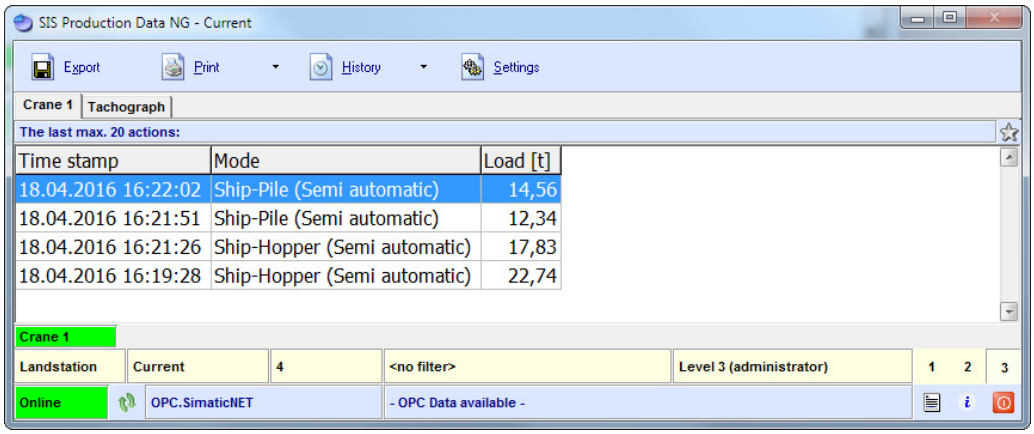
Features of SIS Post Mortem Module





- Analyze PLC values with the accuracy of PLC cycles, triggered f. E. by a fault occurrence to provide additional support for quick fault tracing and removal.
- PLC side monitoring and recording of defined signal values for each PLC cycle.
- Amount of signals and amount of cycles to monitor can be configured.
- A trigger event is used to stop the monitoring after recording a pre-defined amount of additional cycles.
- Transfer of monitored cycle values to the SIS PC via fast OPC interface (approx. 30 sec. transfer duration) after the recording has stopped.
- The SIS PC acknowledges the receipt of the data and enables the PLC side monitoring again.
- Data is stored with timestamp to the local hard disc for further evaluations.
- Use the SIS Post Mortem Viewer to comfortable view the recorded values plotted against the PLC cycle no. axis (time).
- Select up to 8 signals and view their values in a trend display similar to the Data Logger.
- Load / save functions for the signal selection.
- All functions of the Data Logger trend display are available, including a new “Goto Cycle…” function for quick navigation.
- Print the trend or export the displayed data as text file (CSV).

Features of SIS Production Data gathering



- Collection and storage of individual production data of connected devices for an adaptable period into a MS SQL Server Database as history. Storage can be triggered by different kinds of events:

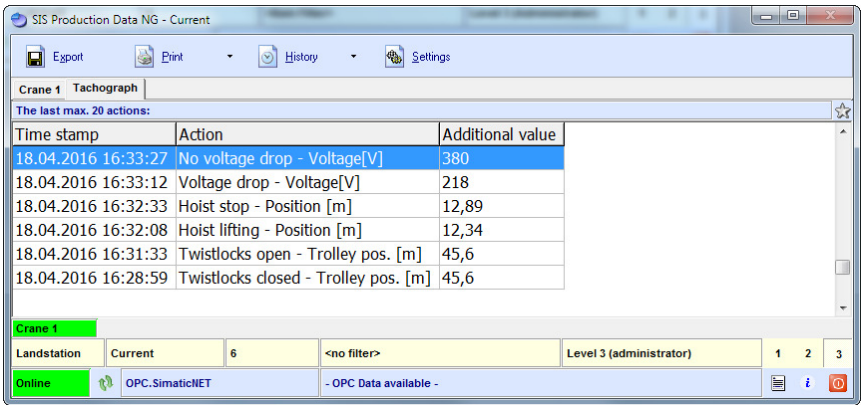
  Trigger bit: Storage on a positive flank of the configured trigger bit signal.

  Trigger value: Storage on each value change of the configured trigger signal.

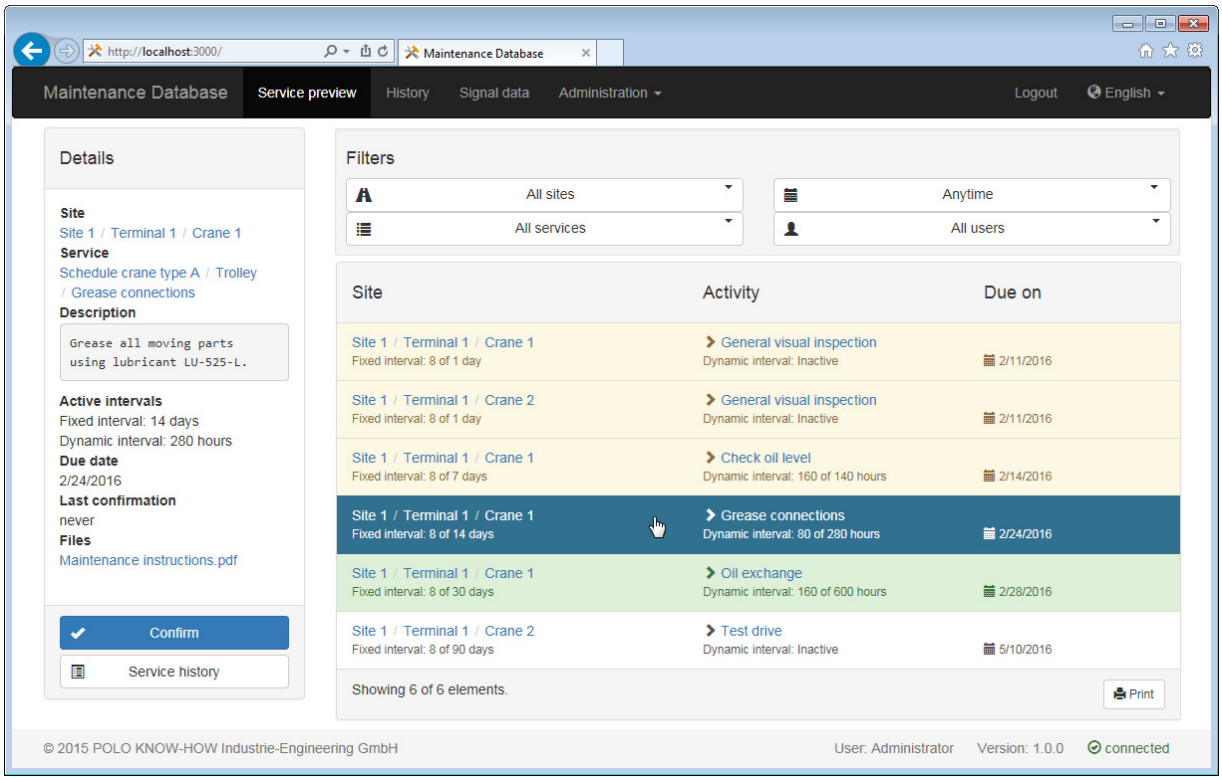
  Interval: Storage in a fixed interval (every x seconds).

  Point of time: Storage on a defined point of time (f. E. at 14:30 o'clock every day) or generally daily, weekly, monthly (without fixed time of day).

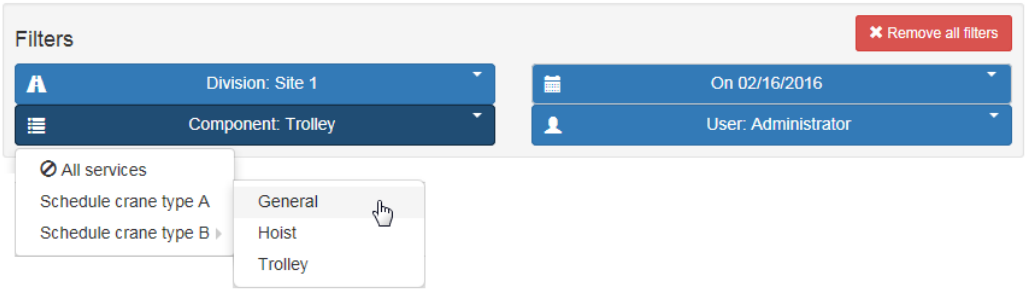
- The display is divided into up to 10 tabulator sheets. Up to 10 signal values can be stored with timestamp on each sheet.
- Additional manual storage of current signal values available for the sheets having the triggers interval or point of time.
- The current / historical views can be viewed, printed and exported.
- Additional „Tachograph" sheet for device action protocolling available.
- Special solutions available on customer demand.



Features of SIS Maintenance Database

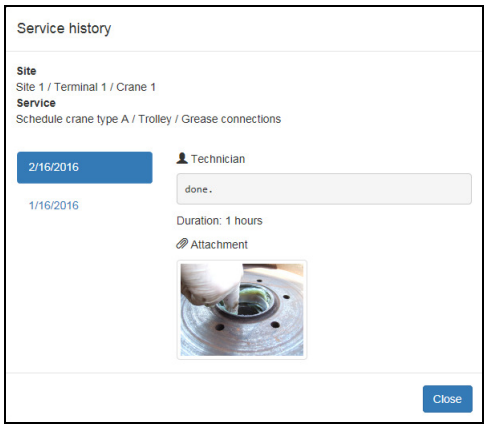


- Scheduled preventive maintenance with reminder function for easy pre-planning and increased flexibility in planning and execution (short, medium and long-term planning) for complete sites equipment in one application.
- Triggers for the activities are operating time counters resp. cycle counters that can be gathered from the crane PLC's daily by the SIS Service Data Collector (automatically) as well as elapsed days since last execution.
- Exact calculation of service due dates depending on elapsed days, accurate prediction of due dates based on real operating time.
- Extensive filter options: Site/Terminal/Crane, Schedule/Component/Service, Date and User.

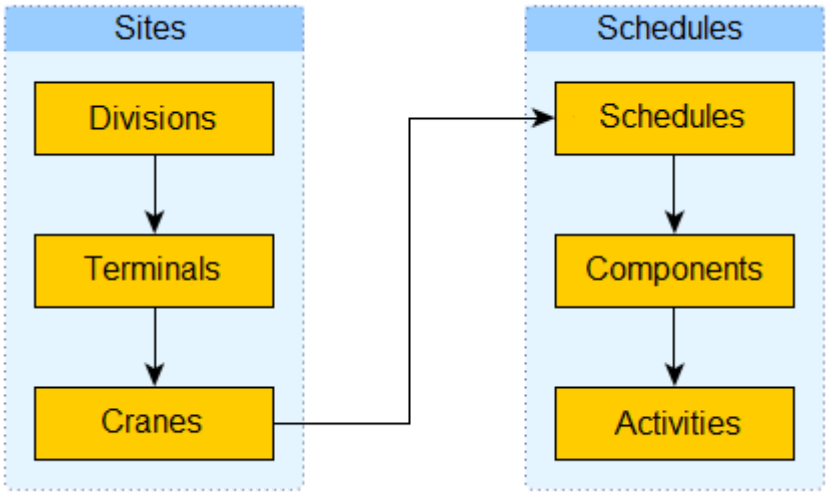


- Service activities can either be specified by the manufacturer or can be added by the user.

- Manuals can be linked to service schedules.
- Service confirmation with date of execution, duration, name of user, optional remarks and attachments as f. E. photos.



- History of service confirmation available (log).
- Displayed preview and history lists can be printed to PDF file.
- Password secured access to the client interface for multiple users at the same time
- User administration with several roles (admin, user admin, service director, technician) included. Full access to services of all sites can be assigned as well as restricted to single cranes / terminals.
- Server application based on Meteor platform using a modern MongoDB database for data storage. Writing to a separate MS SQL Server database simultaneously can be configured.
- Client interface can be called from any modern internet browser like f. E. MS Internet Explorer, MS Edge, Firefox, Chrome, Safari.



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Reference list: SIS System deployed worldwide

Countries	Type of Cranes	Type of Facilities
Germany Austria Switzerland Italy France Ireland Sweden Norway	Shipunloader Container Crane Goliath Crane Luffing Crane Heavy-duty Crane Charging Crane Pan Transport Crane Special Purpose Crane RTG	Port Shipyard Steel mill Power Plant Rail transhipment
Qatar United Arab Emirates India Pakistan Iran	Container Crane Luffing Crane STS RMG RTG	Port
China Vietnam Indonesia Malaysia Thailand Philippines	Shipunloader Goliath Crane STS RMG RTG	Port
United States Canada Panama Colombia Venezuela Chile	Shipunloader Goliath Crane Container Crane Luffing Crane Multi Purpose Gantry Crane STS RMG RTG	Port

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