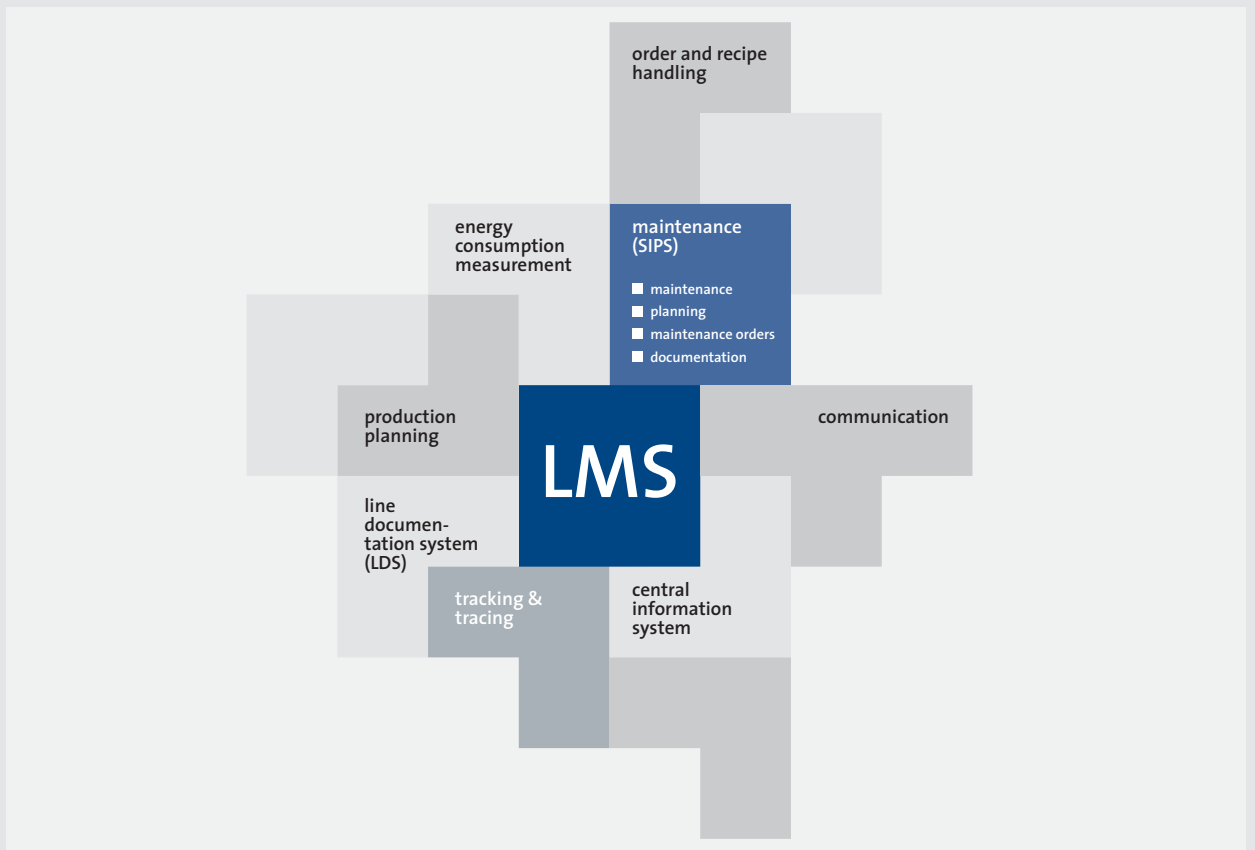




KRONES SIPS
Intelligent Plant Maintenance System



The KRONES Intelligent Plant Maintenance System (SIPS) is a module of KRONES overall solution "Line Management System" for filling and packaging plants. SIPS supports preventive maintenance measures for filling and packaging machines.

1. Present situation

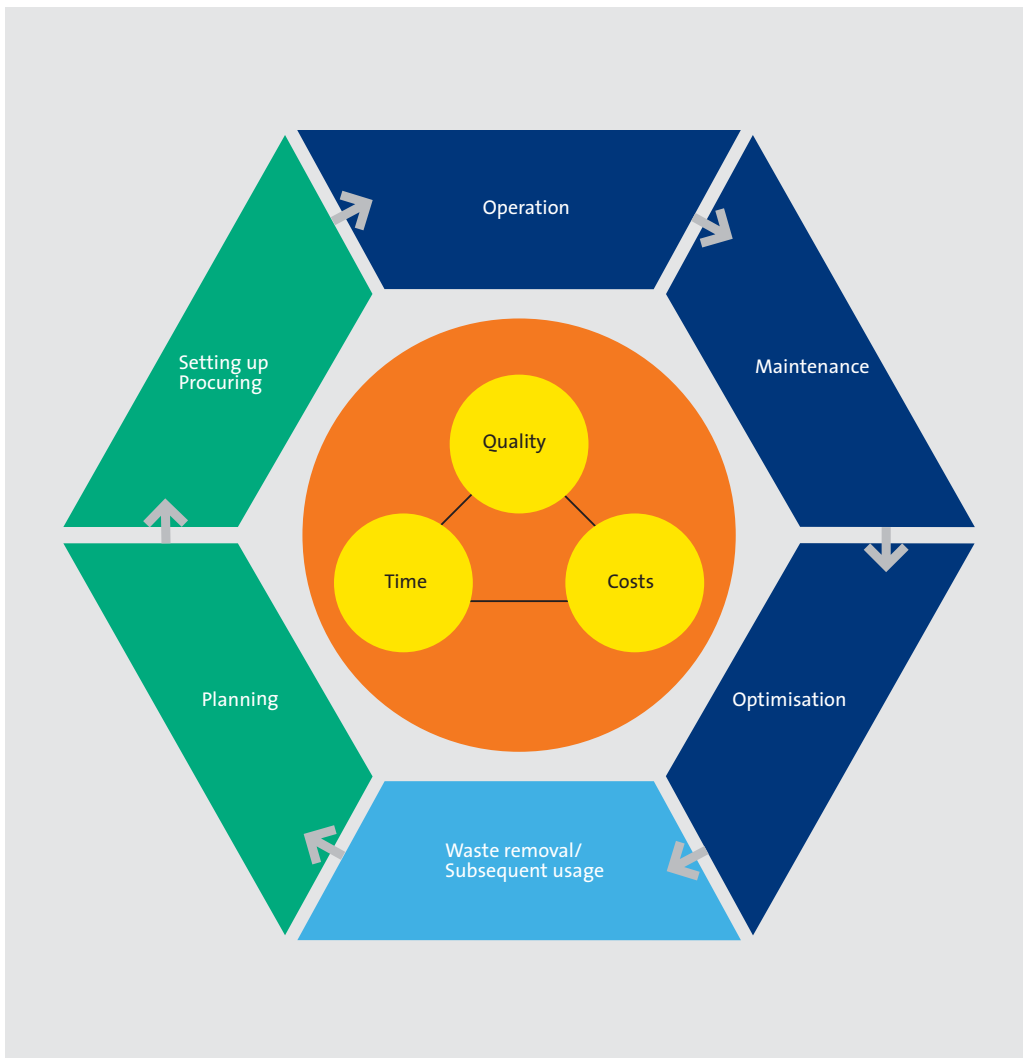
Contents	
1. Present situation	3
2. Approach to a solution	5
3. Performance portfolio	6
4. Specifications	11
5. Advantages	12

The great variety of products and packaging devices, stiff competition and the continually rising standards placed on quality characterise a market in which entrepreneurs are put under pressure to keep their production processes up to date. In order to remain influential and competitive in such a market, it is absolutely necessary that their production processes are free of disturbances and optimally coordinated.

The requirements placed on production processes in plants of the filling and packaging industry are high; they extend from optimum plant utilisation and availability to high yield coefficients, short production times and low manufacturing costs. In addition to these, plant service life that is as long as possible and structured maintenance planning are also demanded.

The effects of a production interruption on the yield amounts and degrees of efficiency of the plants and the related profitability of a firm are decisive for its existence on the market. It is therefore the task of efficient maintenance planning to assure the availability of the plant and to minimise machine breakdowns.

Thus it no longer suffices to react to a plant breakdown on the basis of the fire brigade principle. Nowadays status oriented maintenance measures combined with inspection strategies to protect the efficiency and competitiveness of the firm are demanded.



Condition related maintenance measures:

- Knowing “who, what, when, where, how” on which plant is to be executed
- Operating instructions and orders must be prepared and traced simply and quickly
- Automatic generation of periodic orders
- Reports and historical data documentation as the basis for the development of new maintenance strategies

Total Cost of Ownership’ as Success Factor

- Adjusted personnel requirements
- Shorter reaction times
- Optimised processes
- Higher productivity
- Greater time schedule efficiency
- Optimised consumption of raw/ auxiliary/operating materials
- Minimum capital commitment
- Consistent quality
- Greater reliability regarding decisions

2. Approach to a solution

In the area of maintenance a system was developed with the aid of which the requirements placed on successful maintenance planning can be fulfilled and the life cycle costs of a filling and packaging plant can be reduced. This new development from krones is called SIPS, which stands for krones Intelligent Plant Maintenance System. Tailored to the functional requirements of the respective companies, plant data that is already available can be integrated in SIPS.

Besides high transparency of the data, this system for the interactive support of maintenance planning guarantees fast and simple access to the data for the employees of the company.

Due to the preventive maintenance mechanism of SIPS plant breakdowns can be prevented or reduced to a minimum and maintenance intervals regularly observed.

The solution that is individually configured by the customer contains triggers for certain maintenance operations such as e.g. operating hours, switching loops or calendar related values. Along with operating orders and instructions, reports and messages are also generated and displayed. Acknowledge messages concerning completed maintenance orders are recorded in the system and serve as the data basis for the development of new maintenance strategies.

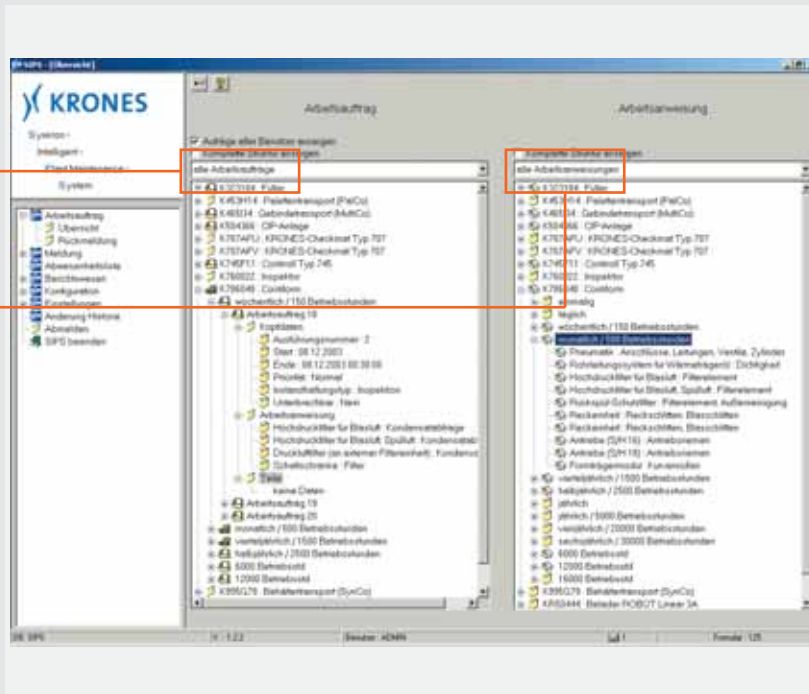


Maintenance handling

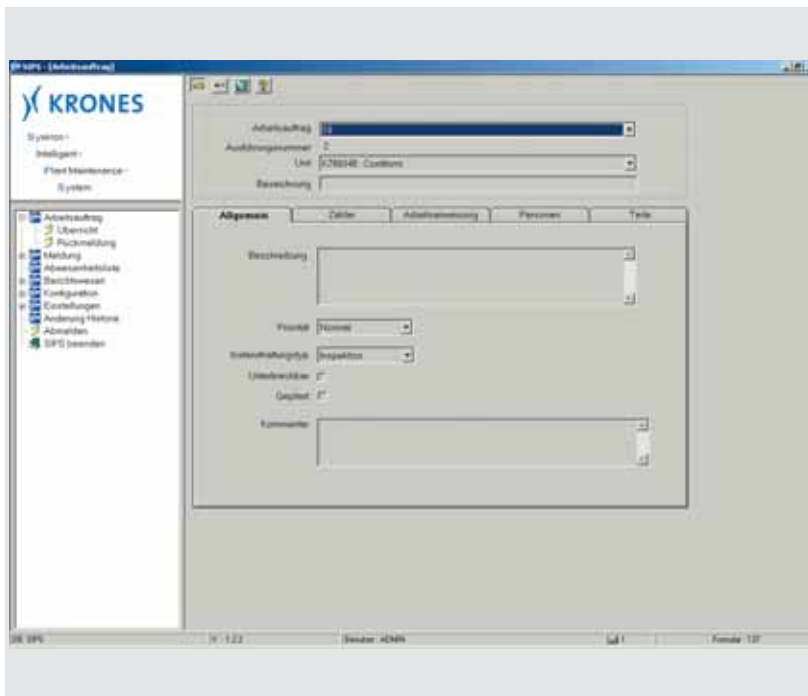
3. Performance portfolio

Customer specific orders

Basic data from the machine manufacturer with "neutral" operating instructions



- **Operating instructions**
Operating instructions contain the necessary specifications for the execution of maintenance measures and serve as the basis for operating orders. All the data required for preventive measures for plant maintenance is stored in SIPS. Operating instructions can be configured at any time in accordance with the requirements of the customer, his production environment and his specific plant characteristics.



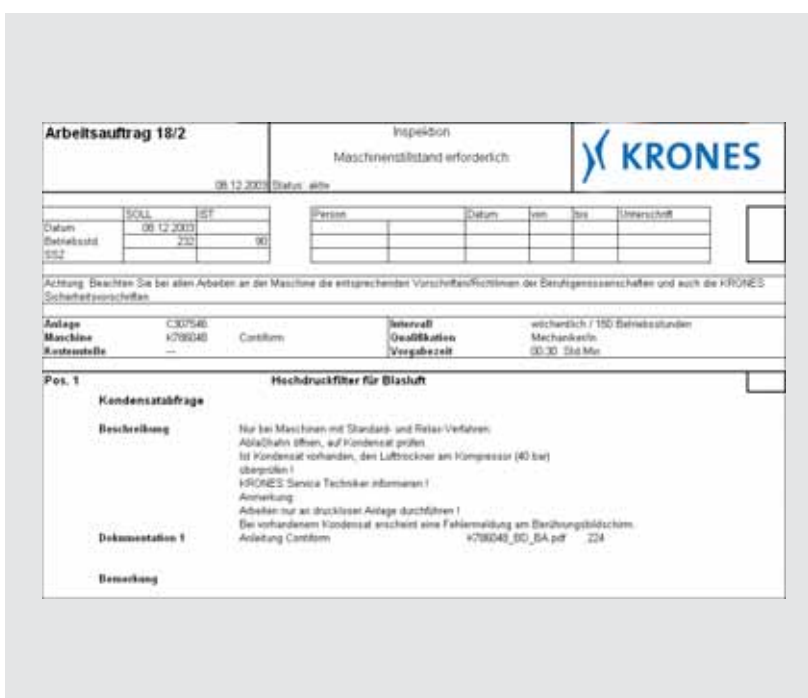
Detailed view of a SIPS operating order

Operating orders

It is by means of operating orders that the KRONES Intelligent Plant Maintenance System enables the exact assignment of maintenance work according to the type of work or responsible employee and includes information about the required parts, the respective cost centre, the machine and plant involved as well as about the estimated time requirement. Operating orders can be maintained in a simple and orderly manner and their degree of processing can be traced.

Messages

Irregularities and deviations in the status and functioning of the production plants can be easily entered into the system with messages. Only basic information about the cause and the location of the disturbance occurrence are hereby required. The subsequent objective evaluation of the messages enables fast introduction of all the steps needed to eliminate the disturbance. Operating orders concerning maintenance work that must be done can be generated quickly and easily from the messages.

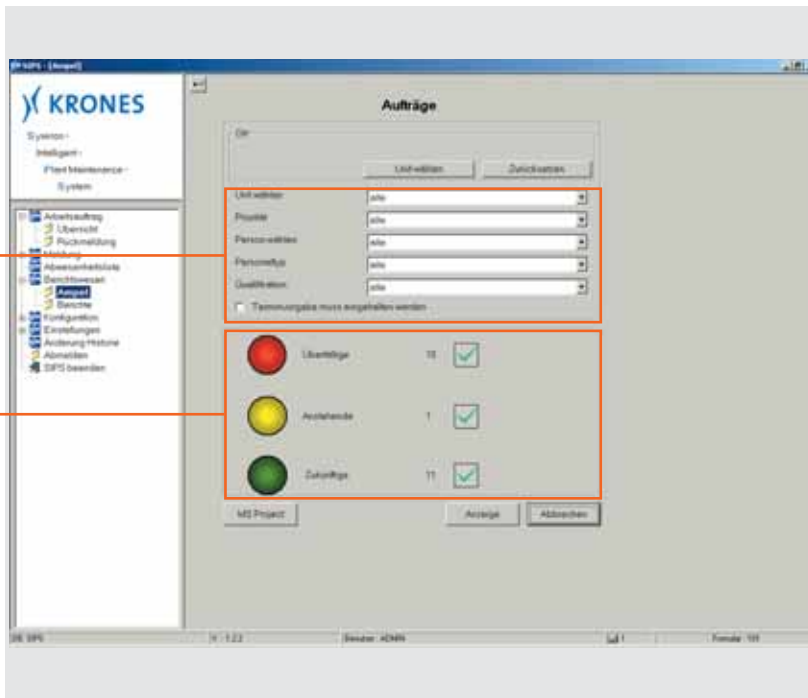


Reporting
Current information and historical data can be evaluated and analysed at any time in SIPS via reporting functions. One thereby obtains a fast overview of the technical status of the entire plant with relation to maintenance work.

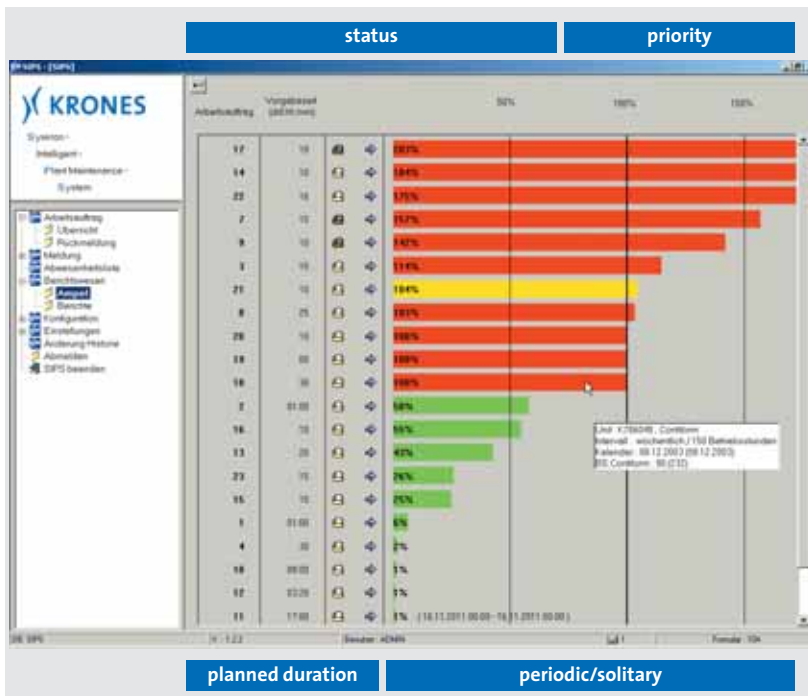
In order to plan, trigger and coordinate specific maintenance measures, current activities (orders to be carried out) are visualised by means of coloured status information. For the simple designation of the due status of operating order processing the system uses the traffic signal function: from green, proceeding to yellow, up to red.

Limiting criteria

Number of and due time of individual maintenance measures



- due time passed
- due time soon
- due time later



Alarm limit and warning limit hereby form the specification for the determination of the status criteria. Operating orders for the maintenance of machines or plants, the execution of which is in first place, are also displayed first in SIPS.

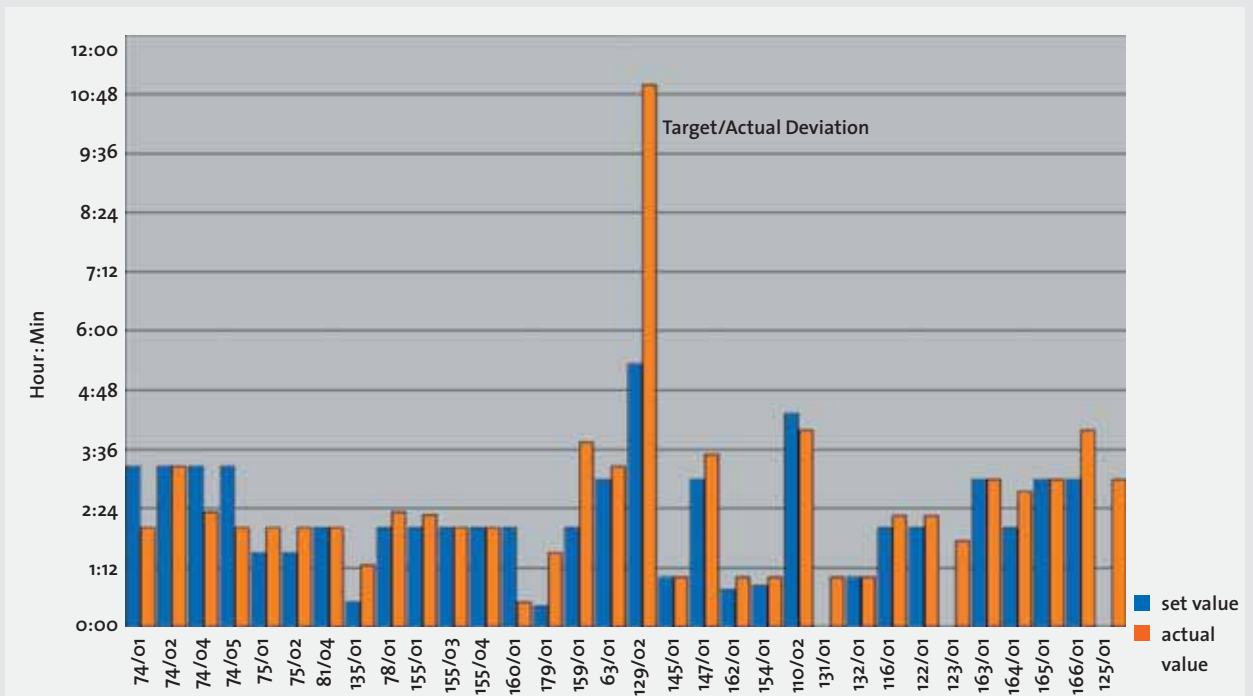
Compact summaries and reports for orders to be fulfilled enable fast and detailed recognition of peak personnel loads that occur and adjustment of the execution times of the orders.

Anticipatory overviews covering freely definable time periods offer a number of filter functions.

Overviews can be filtered according to:

- orders to be carried out
- certain machines
- certain persons
- freely definable time periods
- acknowledge messages from completed orders

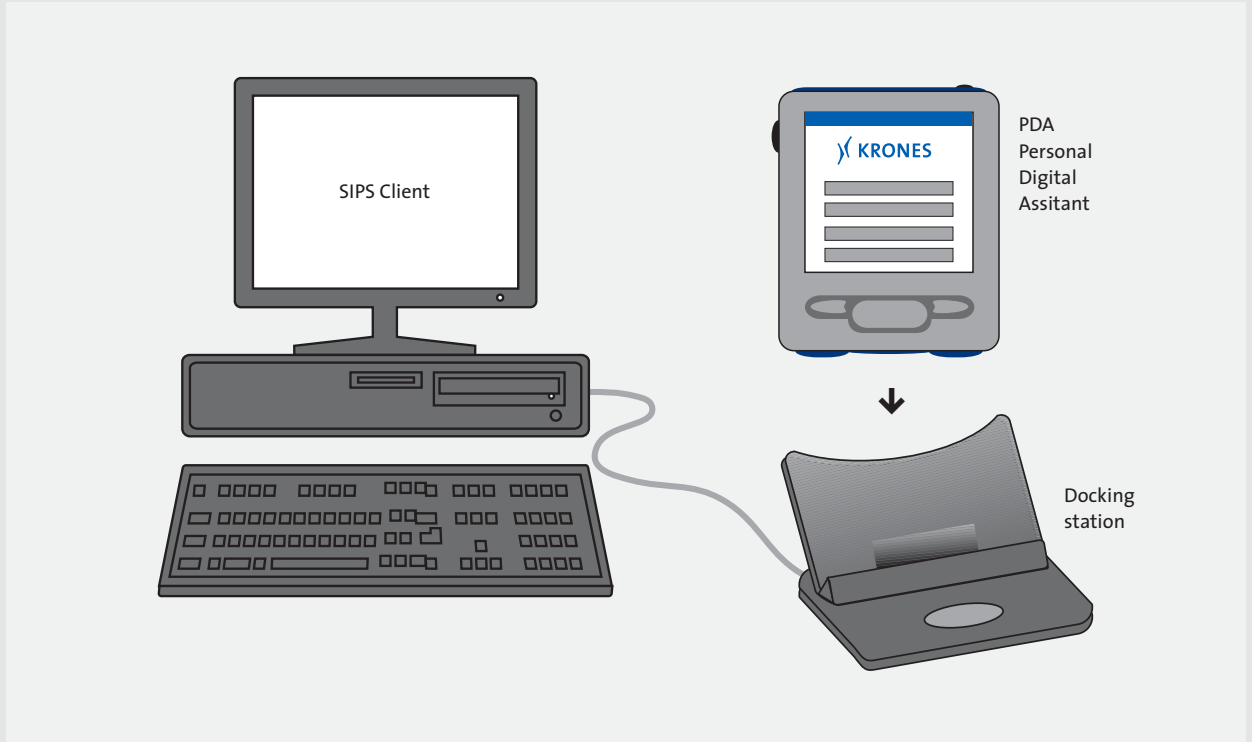
Variance comparison of time specifications for maintenance work



Historical data reports

Historical data reports provide the basis for future planning of maintenance measures. The evaluation and analysis of the data hereby form the decisive foundation for the development of new strategies for maintenance work.

Graphic displays and reports about the time requirements for maintenance measures, order execution and changes, the necessary manpower or the acknowledge reports of completed orders are also available as planning aids. Information about the duration of the carrying out of the order is provided among others by the report on the set value/actual value deviation of the time specifications that is integrated in SIPS.



Mobile Application on Pocket PC

■ SIPS on a Personal Digital Assistant (PDA)

Electronic address and date managers from the realm of office communication are currently conquering a new area of application in industrial usage: maintenance.

The data is then available at those locations at which the maintenance work is to be executed. The mobile pocket PCs that may be employed here are industry capable devices that correspond to the IP54 standard that are protected against dust and splash water.

Features of SIPS on Pocket PCs:

- simple operation
- access safety due to password protection
- portable database on the pocket PC
- overview of maintenance orders
- acknowledged reports on completed orders (incl. time requirement)
- recording of values from analogue counters
- preparation of (damage) reports
- synchronisation of the data between SIPS and the PDA

■ SIPS local warehouse management system for spare parts

The KRONES Intelligent Plant Maintenance System offers the possibility of integrating a module for the management of spare parts. Incoming goods, dispatched goods, return storing, the correction of stocks and inventory can all be recorded simply and reliably

with the SIPS local warehouse management system. All articles or parts required for maintenance operations are hereby entered in a protocol in the local warehouse at the customer's premises.

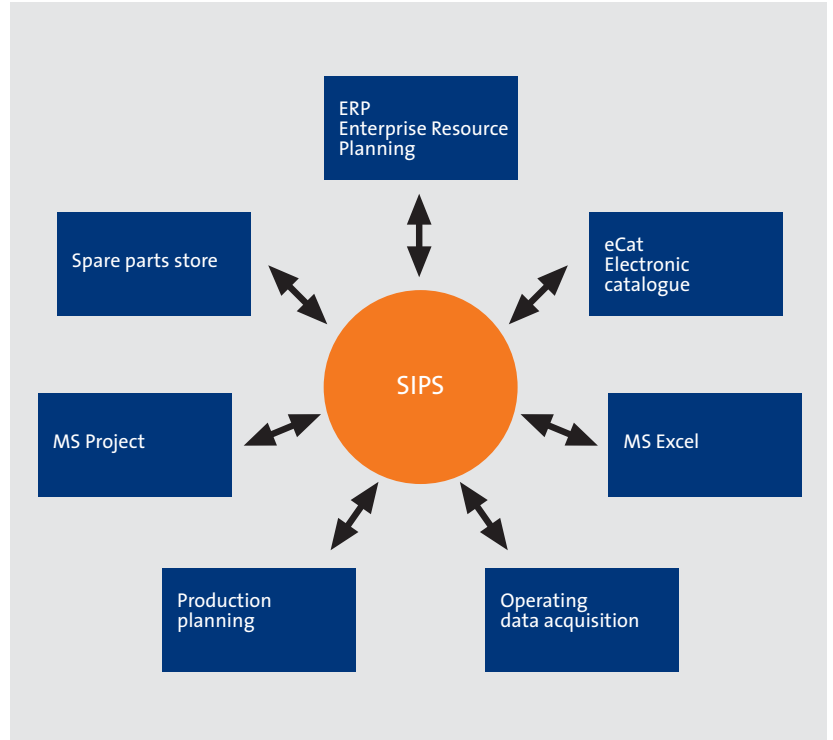
Management of the spare parts with the SIPS local warehouse management system represents an enormous relief. Besides the continuous documentation of changes in stocks, the exact recording of warehouse location and storage place, prescribed minimum amounts of stocks are monitored electronically at all times. A drop below such a minimum level is signalled and then a request notice is generated. Spare parts needed for maintenance operations can thus be obtained quickly and easily at all times and this guarantees an optimum, smooth running production process.

4. Specifications

The KRONES Intelligent Plant Maintenance System as an integral component of process automation in the area of filling and packaging, enables the integration of various production and company departments via a variety of interfaces.

Via interfaces of SIPS:

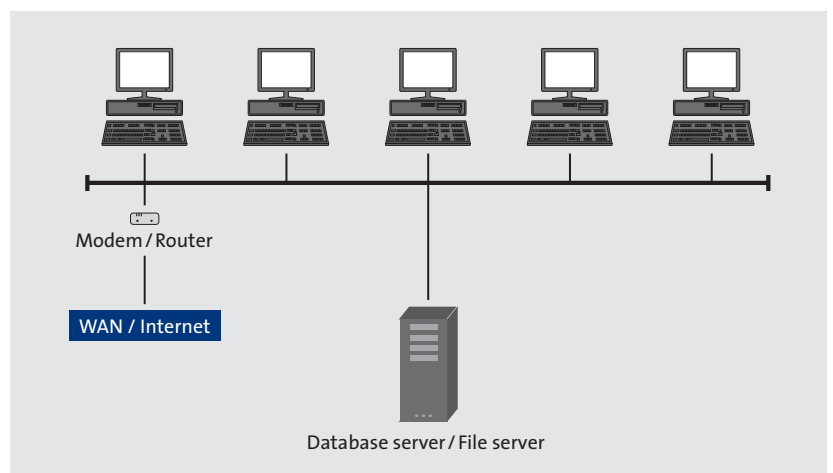
- maintenance data with the company's own ERP system can be exchanged
- the existing operating data acquisition system can supply necessary information for future maintenance measures
- the procurement process can be optimised by the connection of KRONES eCat and the transmission of automatic request notices



Standard products such as MS-Excel, MS Project and XML may be used for the evaluation, documentation and visualisation of all necessary maintenance data. Highly efficient relational databases such as Microsoft SQL Server or Oracle assure the continual availability and safety of the data. The implementation of SIPS can be effected in various versions, from standalone to a client/server solution.

■ Configuration

The contents of the maintenance system are defined, controlled and regulated by means of "Configuration". Settings in the configuration of the system can be made simply, quickly and clearly.



Configuration of the system:

- parts
- counters
- persons and access rights
- intervals
- machines/units
- maintenance objects
- documents
- specifications

The modular structure and the numerous integration possibilities of SIPS increase the flexibility of the software and enable later expansions. Because of the possibility of international language selection and SIPS design as an "open" system, it can be employed throughout the world in very different areas.

5. Advantages

The KRONES Intelligent Plant Maintenance System not only enables the simple and well organised planning of recurring maintenance measures but it also optimises maintenance processes.

faster – more effective – more transparent – at more reasonable cost.

- increase in availability and degree of efficiency of the plant
- minimisation of unplanned plant downtimes
- greater plant efficiency and slighter total cost of ownership
- assured preservation of plant status
- lengthening of plant service life
- reduction of maintenance and outage costs
- more efficient employment of maintenance personnel
- time expense analyses for machines and personnel
- history (long-term statistics and control mechanisms)
- not an “empty shell” but a structured system
- open system, integration of data from third parties possible

Legends:

Client	Customer PC
eCat	Electronic spare parts catalogue from KRONES
ERP	Enterprise Resource Planning (e.g. SAP program)
IP 54	International Protection
PC	Personal Computer
PDA	Personal Digital Assistant
SIPS	KRONES Intelligent Plant Maintenance System
SQL Server	Structured Query Language Server
TCO	Total Cost of Ownership
WAN	Wide Area Network
XML	Extensible Markup Language