

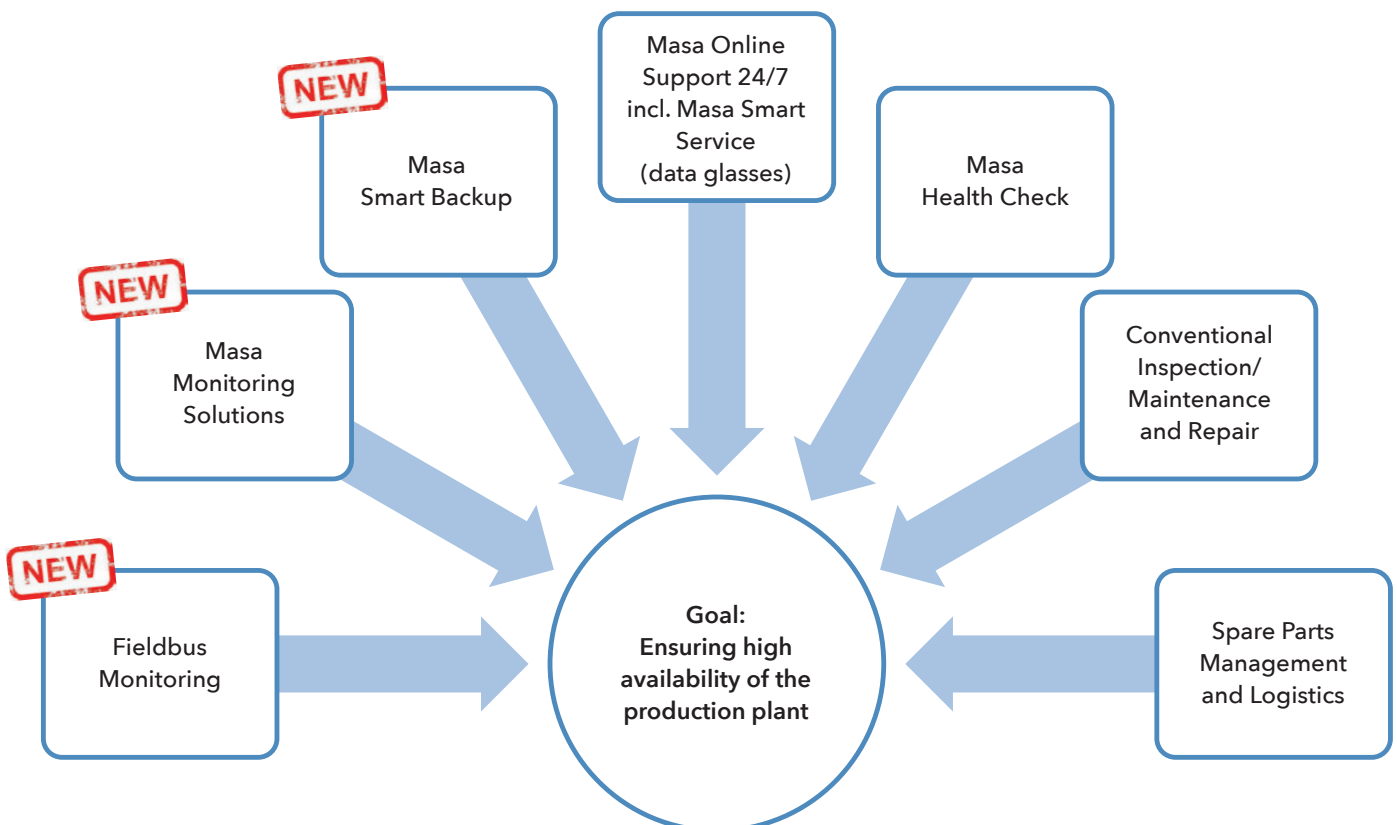


# Future-oriented maintenance – digitally supported

Machines and production plants for manufacturing concrete blocks and pavers have developed enormously in recent decades, both in terms of their complexity and their technology. Understanding the current status of individual components or assemblies is becoming an increasingly challenging task in modern plants, as more automated processes means more potential sources of problems. Many components are subject to wear and can cause defects. PC's, PLC's, and other electronic components are particularly affected by aging and wear. This can be exacerbated by unfavorable surrounding conditions, often found in a plant environment.

With growing competitive pressures for superior quality products and high outputs, the focus of concrete block producers is also in ensuring the highest possible plant up time.

Appropriate maintenance management becomes one of the most important factors, because it has a direct influence on the functionality of equipment within the production plant. It helps to ensure consistent and repeatable production of quality products, maintaining the safety standards of the equipment for those who operate it, extending the service life of the machines, and minimizing downtime and costs. The level of knowledge and experience of the operating personnel of the production plant is a factor that should not be underestimated. However, it is precisely in this area that deficits are becoming increasingly apparent, as the search for suitable operating personnel is becoming more and more difficult in today's competitive labor market. To compensate for this development, Masa relies on a mix of different services and tools that can actively support the plant operator's maintenance management.



Portfolio Masa Service

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All technical solutions are individually planned, designed, adapted and realised for each customer, resulting in one supplier and one individual contact person.

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**Maintenance**

According to the standards DIN EN 13306 and DIN 31051 (listed in the German Set of Standards), maintenance is the combination of all technical and administrative measures as well as management measures during the life cycle of an object to maintain or restore it to a functional state so that it can fulfill the required function.

While DIN 31051 structures maintenance into the four basic measures "maintenance", "inspection", "repair" and "improvement", DIN EN 13306 divides maintenance into the two categories "preventive maintenance" and "corrective maintenance".

**Maintenance**

- Save the state of the plant
- Activities: e.g. readjustment, lubrication, cleaning, refilling

**Inspection**

- Detect and evaluate the wear
- Activities: e.g. planning, measuring, testing, diagnosing

**Repair**

- Restore the functional status
- Activities: e.g. replacement, mending, repair, functional test

**Improvement**

- Increase functional reliability
- Activities: e.g. analyzing, designing, extending, substituting components

*Four basic maintenance measures according to DIN 31051*

**Digital and on-site strategies for maintenance**

Preventive and predictive maintenance strategies are playing an increasingly important role in achieving maintenance goals in modern concrete block production plants. Instead of carrying out maintenance reactively after damage occurred, it can be done preventively or proactively.

**Digital strategies**

With digital backup and monitoring solutions, Masa offers several tools to quickly diagnose the causes of actual failures, as well as predictive detection of potential failures.



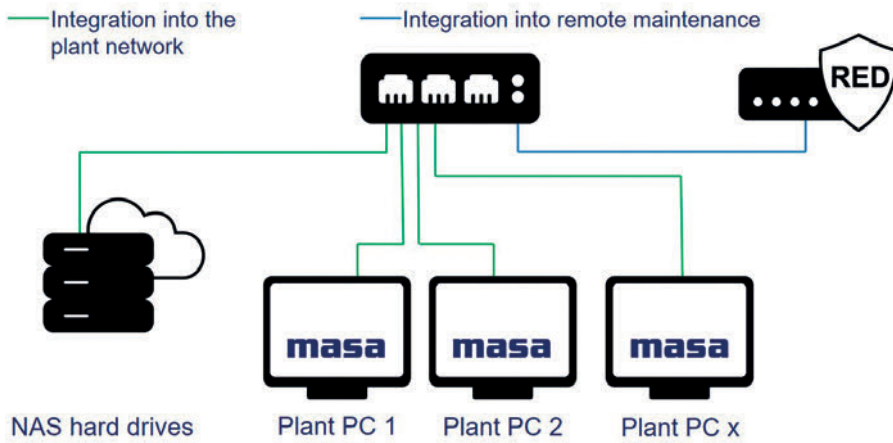
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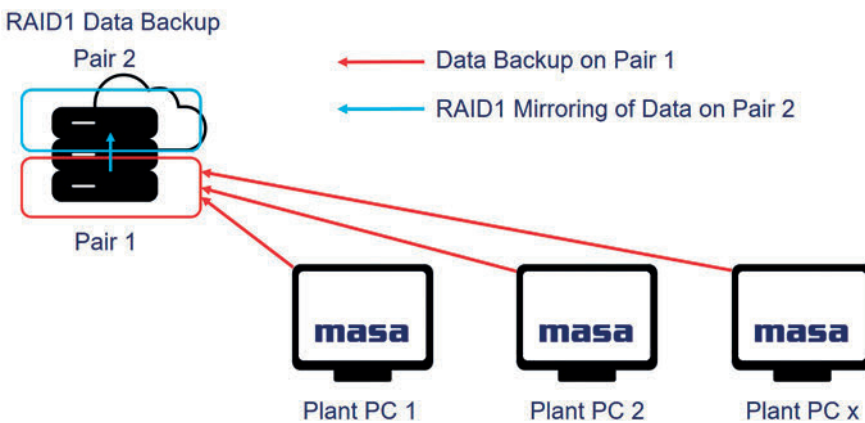
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Masa Smart Backup: Integration into the Online Support



Masa Smart Backup: RAID Mirroring

### Masa Smart Backup

For example, one of the possible causes of failure in industrial computers is the failure of hard disks. To reduce the associated loss of data, Masa is integrating so-called NAS (Network Attached Storage) systems into production plants. The system, named Smart Backup, is a backup station equipped with four NAS hard drives. The desired data redundancy is achieved by backing up all relevant plant data on two pairs of hard disks each. In the event of a hard disk failure, the data can be restored from the other hard disks. The backup includes the recipes and product data acquisition database of the production plant as well as all control programs required for automation. The coordination and execution of the fully automatic backups are handled by the Masa Smart Backup System, which is always active in the background. Restoring the data in this way can easily be done online by Masa technicians.

### Masa Monitoring Solutions

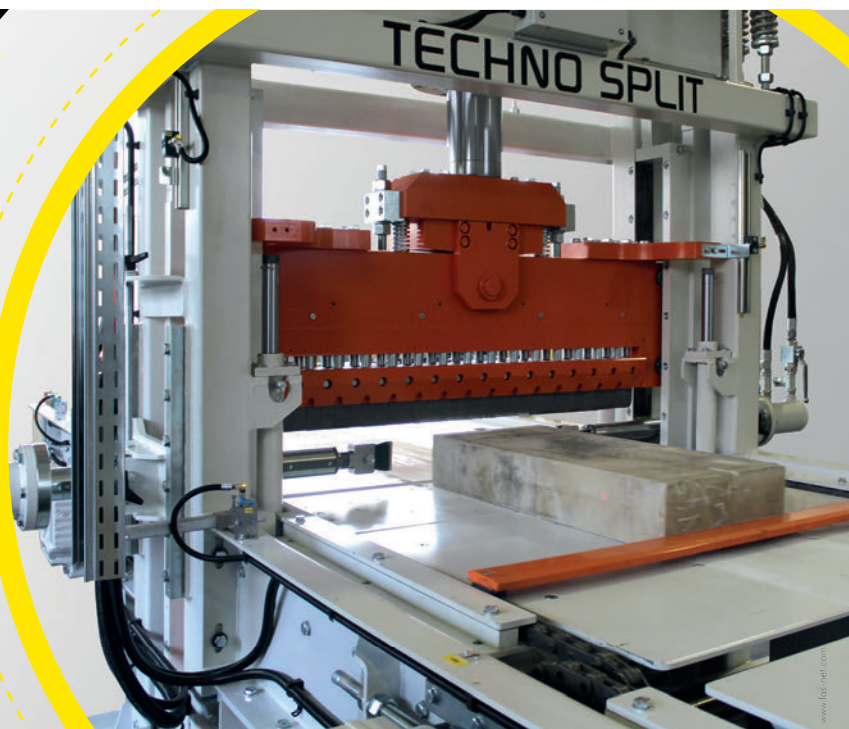
Masa Monitoring Solutions (MoSo) relies on Masa Online Support to monitor the status of the plant computers and the online connection via the RED router (Remote Ethernet Device).

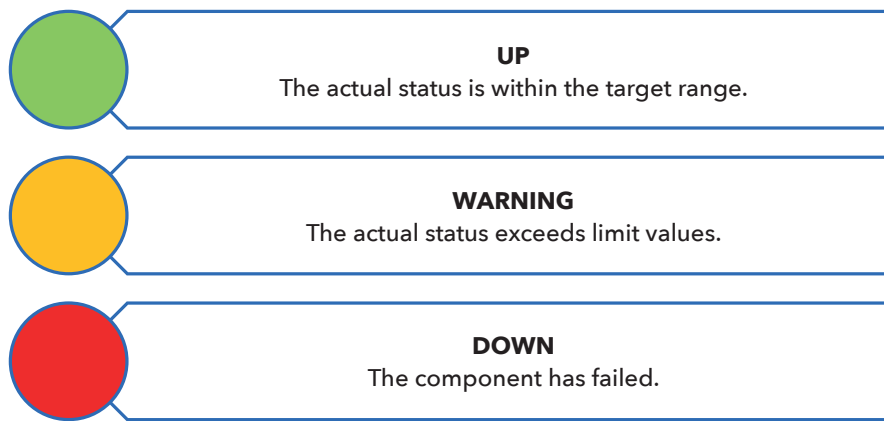


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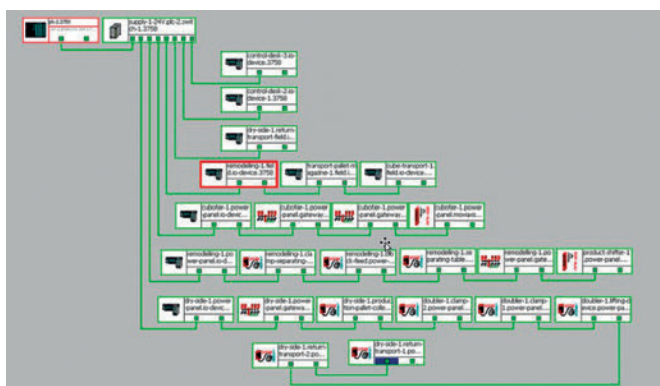
*The actual status of the plant computers is displayed in a three-stage system.*

Two points play a decisive role here. Especially in case of a machine or plant malfunction, a stable online connection to Masa Online Support is essential. "Surprises" such as a missing online connection leads to unnecessary delays. Therefore, regular monitoring of the connection to the RED router is extremely important.

On the other hand, monitoring the actual status of the plant computers is helpful in detecting any exceeding limit values at an early stage. Relevant values such as temperature, storage capacity, accessibility or fan speed are analyzed at defined intervals. If the defined limit values are exceeded, a maintenance stop can be scheduled promptly. This significantly reduces the risk of unplanned downtime. The actual status of the plant computers is displayed in a three-stage system.

**Fieldbus Monitoring**

Field bus systems such as Profibus or Profinet form the basis for the operation of modern plants. Communication and data exchange between the individual bus participants is the prerequisite for trouble-free plant operation. However, components such as connectors, cables, or the interface modules (IM) are also subject to aging or wear. By monitoring the communication protocols and the line physics, a direct indication of weak points in the system can be displayed. Modules can then be replaced before a failure occurs. Since troubleshooting in the fieldbus is known to be very time-consuming, such diagnosis and monitoring is extremely helpful. Masa has been working intensively on the topic of fieldbus monitoring



*Bus topology*

for several months and is currently examining the possibilities for integration into future and existing plants. In general, cloud-based applications are also quite conceivable for Masa.

**Masa Online Support 24/7**

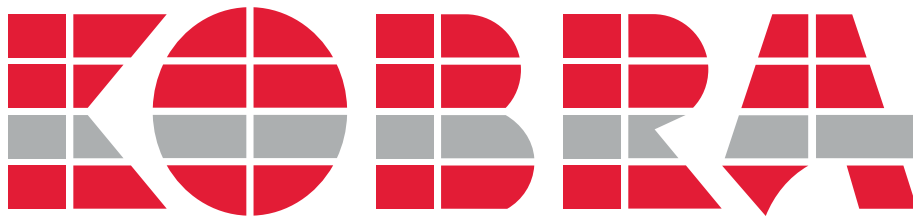
Masa has been offering reliable 24/7 online support for several years. Using suitable remote maintenance hardware and software, requests can be responded to quickly and efficiently. Several possible communication channels ensure the Masa online support remains accessible.

In the event of a malfunction, the Masa support team can perform diagnoses and "first aid" measures around the clock much faster and easier. Downtime is reduced and the need for on-site visits by Masa service technicians is not required as often. In addition, updates and function expansions on the production plant can be carried out conveniently and quickly (within Masa office hours).

The customer-specific documentation of each Masa Online Support action carried out is made in a comprehensive database and ensures constant traceability of the measures. Plant operators can view the documented fault and fault clearance histories at any time. This enables them to draw conclusions for faster fault diagnosis and elimination, or to research possible triggers of recurring faults.

**Masa Smart Service**

The live connection of the Masa Smart Service can be used to supplement the Masa Online Support (additional customer requirements are required, e.g., fast and stable internet connection via landline or UTMS, W-LAN coverage around the plant). By means of a voice-controlled head-up display with camera (data glasses), a connection is established between the customer's technician and the Masa online support staff. Certified with IP66 protection class (dust and waterproof), the data goggles are shockproof up to a 2 m drop and are attached to a conventional hard hat. The hands-free function and voice control of the data goggles can be used even in extraneous noise of up to 95 dB. A live stream with Masa Online Support is established via a Masa service app. The Masa Online Support employee can now visually accompany and guide the person on site and thus actively support maintenance work or troubleshooting. Here, functions such as send-



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*Digitally supported by means of Masa Smart Service*

ing hints/markers to the display, sending documents to the display (screensharing), or taking photos in HD quality are helpful features of the data glasses. A session ID is assigned for verification during login and for documentation and tracking. Each session can be recorded if desired.

Communication and first aid via Masa Smart Service offers considerable advantages: Firstly, visual control of machine functions is possible, as well as simplified support in the event of process-related problems. In the event of mechanical, hydraulic, or electrical malfunctions, guided troubleshooting support can be provided. Important information from circuit or hydraulic diagrams can be projected onto the head-up display.

**On-site maintenance strategies**

As always, the second focus of Masa's services and tools to support maintenance management is on machine and component-related measures. The conventional inspections, maintenance, and repairs carried out on site can be extended by the Masa Health Check. For the replacement of components, the Masa Spare Parts Service team is also available to provide advice.

**Conventional Inspection, Maintenance and Repair**

Masa provides expert support for the inspection of a production plant. The actual status of the plant is recorded, docu-

mented, and assessed. The functioning of the entire plant as well as all plant components, settings, and values are checked. Components are examined for signs of wear (visual inspection), then the degree of wear is evaluated. Maintenance work should delay and minimize the progress of wear, and in the best case can even prevent it. The target status is to be restored.

Masa provides maintenance plans as part of the plant documentation, which contain various work steps for the maintenance of the respective assemblies.

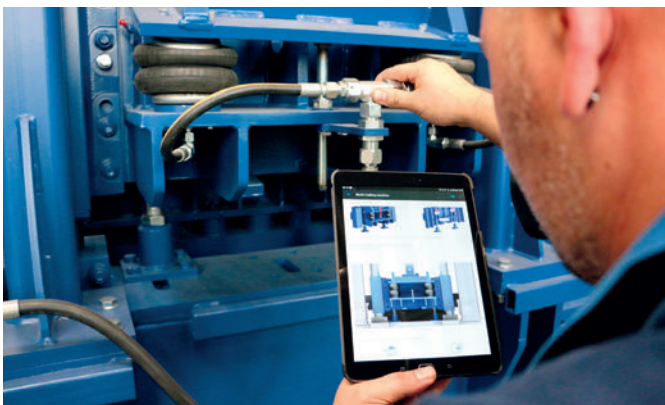
The maintenance plans specify, for example:

- Cleaning work
- Maintenance work
- Checking of settings
- Recording of measured values
- Inspection, exact adjustment, replacement of plant components
- Checking of filling levels
- Lubrication and troubleshooting plans

Regular inspections and maintenance have a positive effect on the wear and tear of machines and plants. Nevertheless, even when used as intended, wear-related damage can occur that requires immediate repair. Defective parts or entire assemblies must be repaired or replaced. For maintenance work in production plants with an upcoming "winter repair" Masa keeps a trained service team ready. The service department will be pleased to answer any inquiries and to schedule a visit.

**Masa Health Check**

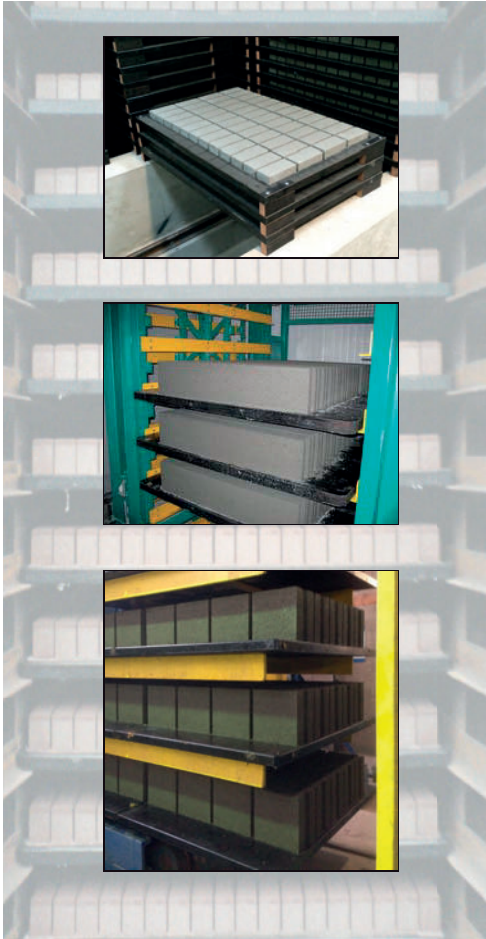
As part of a preventive maintenance and repair measure, the machine inspection "Masa Health Check" can be booked. Experienced Masa technicians then take over the inspection and objectively and reliably check the status of the block making machine, taking into account a defined and detailed checklist. For each Health Check, Masa prepares a report that includes an action plan as well as spare parts and adjustment recommendations. Provided that this action plan is adhered to by the plant operator, the Masa Health Check is a possible instrument to keep the machine productivity and availability at a consistently high level.



*Masa Health Check: Inspection mold bearing*

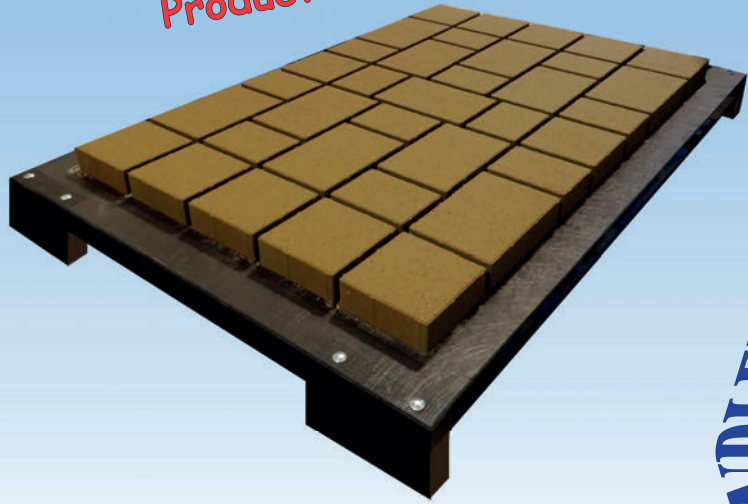


*Masa Health Check: Checking the general status of the hydraulic system*



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With regard to plant productivity, the Masa Health Check pursues the following goals:

- Less unplanned downtime
- Shorter repair times of the machine
- Lower impact of downtime on the production process

Depending on the actual compliance with the recommendations, the service life of the machine can be extended. The planning of (recommended) actions such as checking, adjusting, replacement of wear and spare parts is simplified.

However, the sole definition and execution of inspections and maintenance tasks is not sufficient for the realization of the above-mentioned goals. Rather, a smooth replacement supply is also of great importance. By means of the report generated from the Masa Health Check, Masa prepares a recommendation for preventive stocking of wear and spare parts. The plant operator can check their existing stock and, if necessary, supplement it as required when thinking of planned maintenance work required in the future.

**Spare Parts and Spare Parts Logistics**

Even short downtimes in a production plant cost time and money. The availability of original spare parts, which are optimally matched to Masa machines and plants, and efficient spare parts logistics have a positive effect on plant productivity. For this reason, Masa incorporates decades of experience and know-how into the development and production of Masa original spare parts.

Masa's spare parts service focuses on another comprehensive service: Competent technicians in the spare parts sales department assist in identifying the right spare part and always advise on the purchase individually matched to the respective plant components. Each order request is subjected to a technical check by Masa specialists before dispatch. Once the order has been approved, Masa original spare parts are then professionally packed and delivered. Masa works exclusively with worldwide operating freight companies in order to guarantee a smooth delivery.

| Location  | Capacity (number of different part numbers per location) |
|---|--|
| <b>Masa GmbH</b><br>DE - Porta Westfalica                                 | > 7,500 Part no.   |
| <b>Masa GmbH</b><br>DE - Andernach  | > 5,500 Part no.   |
| <b>Masa-USA, LLC.</b><br>USA - Green Bay                                  | > 2,500 Part no.   |
| <b>Masa Middle East FZCO</b><br>VAE - Dubai                               | > 1,500 Part no.   |
| <b>Masa-Tianjin Building Material Machinery Co., Ltd.</b><br>CN - Tianjin | Spare parts on request                                   |



Masa spare parts stocks worldwide

A well thought-out spare parts and shipping logistics system allows spare parts requests to be accepted and processed without delay and Masa original spare parts to be shipped as quickly as possible. The close cooperation between Masa locations worldwide as well as the on-site support of customers have proven their value. With two Masa locations in Germany and Masa subsidiaries in the United Arab Emirates, USA and China, short delivery routes for wear and spare parts can be realized.

If country-specific, longer import times are to be expected, Masa additionally recommends stocking the most important wear and spare parts in order to avoid longer downtimes in a production plant. The selection and compilation of a reasonable, individual spare parts package can be done in coordination with the Masa service staff. ■



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