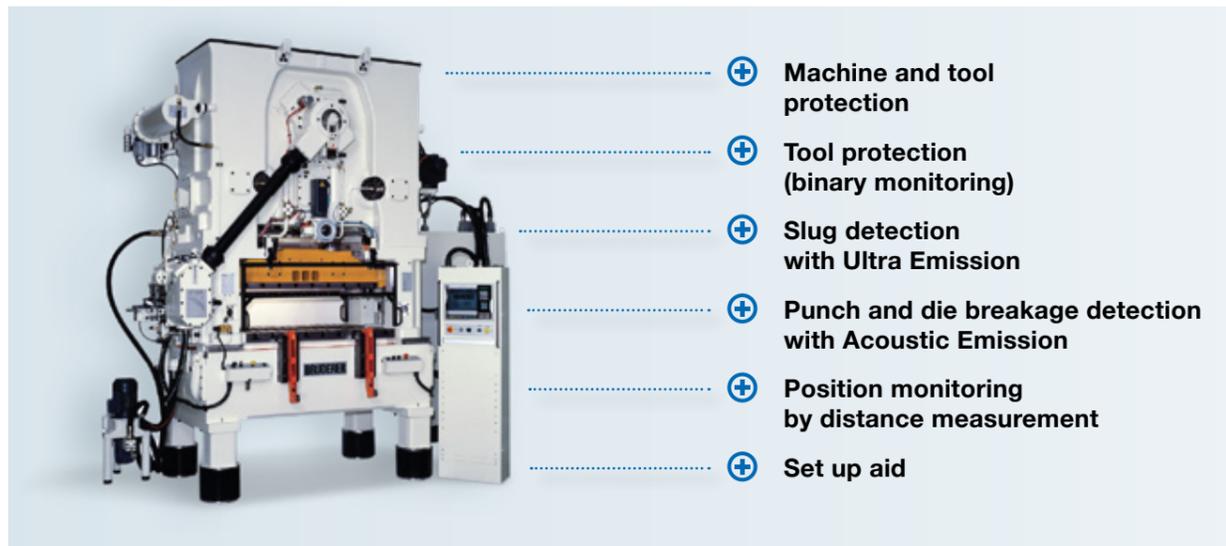


## PROCESS MONITORING *STAMPING*



# MARPOSS

# PROCESS MONITORING



## MONITORING SYSTEMS

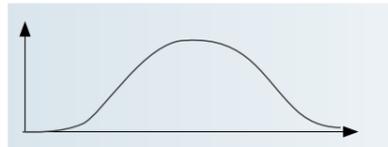
BRANKAMP monitoring systems are used in a wide range of applications in sheet metal forming. Regardless of the machine size or speed, similar monitoring methods can be used. Only the number, type and position of the sensors varies for different tasks.

### CAN BE MONITORED:

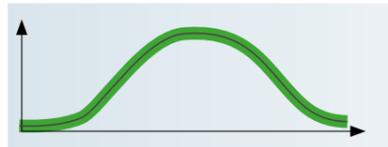
- Small presses (< 200 kN)
- Large presses (> 10 000 kN)
- Slow presses (< 20 H/min)
- High-speed presses (> 1.000 H/min)
- Mechanical, hydraulic or servo-driven machines
- Multiple-acting presses

## FUNCTIONAL METHOD

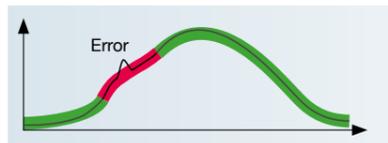
The principle of process monitoring



At each stroke a sensor measures the occurring process signals (e.g. press force).

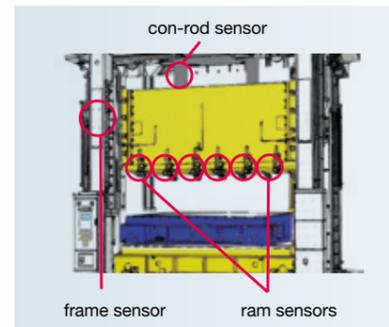


The process signals are taught-in during good part production and limits (envelope curves, etc.) of faultless production are calculated automatically.



If one of the monitoring limits (e.g. envelope curve) is exceeded, the part is sorted out or the machine is stopped.

## SENSOR TYPE AND POSITION

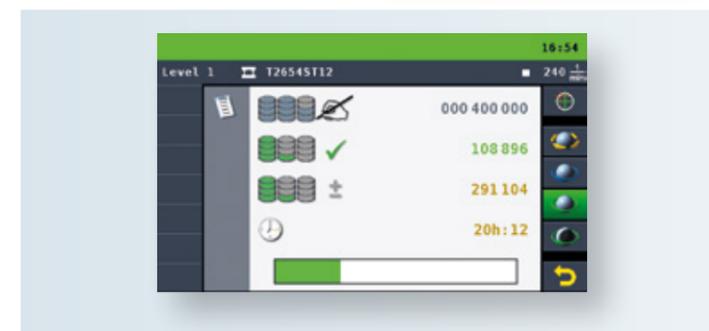


The sensor type and its position are determined by the respective monitoring task.

- Calibrated press forces are preferably measured on the machine frame or on the con-rod
- Machine-side sensors in the ram are used for global tool monitoring
- Tool-side sensors are installed close to the process above fault-critical forming operations



D - Sensor



## MACHINE AND TOOL PROTECTION

to avoid subsequent damages

Overloading the machine or individual tool areas can cause high repair costs and downtimes. To detect overload, sensors are installed on the frame or in the connecting con-rod. If individual maximum force limits are exceeded, the machine is stopped immediately.

## DYNAMIC ENVELOPE CURVES

detect sudden process errors

Envelope curves are calculated during Teach-in around the entire signal curve taking into account the process scatter. Thus, successive forming operations such as blanking, drawing or coining can be monitored with one sensor. The dynamic envelopes automatically adapt to slow signal changes (tool heating, wear, etc.). Sudden malfunctions are detected with high precision.

## TREND MONITORING

detects long-term process changes

Fixed adjustable trend limits allow to detect slow process changes. The trend can be displayed stroke- or time-dependent. If the set trend limits are exceeded, the machine is stopped.

## SET-UP AID

shorter set-up times

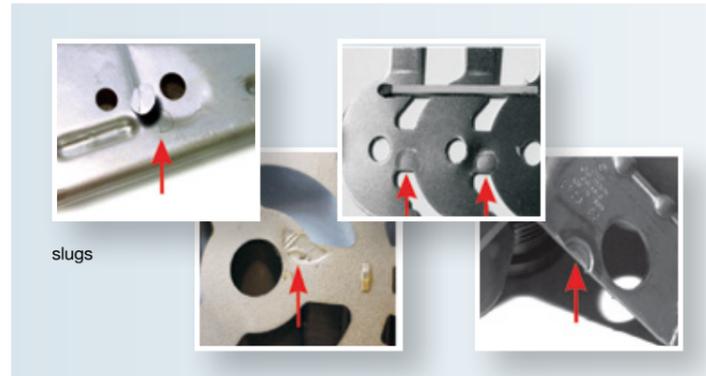
Reference curves of the last faultless production stored in the tool memory can be displayed during re-equipping and compared with the current process signals. Tool set-up is facilitated and set-up time shortened. Tool revision errors can be detected immediately.

## COUNTER

a variety of counters provide real-time information on the current process situation

Comprehensive counting functions indicate the current counter status, e.g. of orders, various tools, shift performances, quality controls, container status, maintenance intervals and good and bad parts, indicate remaining times and can trigger a machine stop when the specified target numbers are reached.

# PROCESS MONITORING SPECIAL



slugs

## ULTRA EMISSION

### detecting slugs

Ultra Emission detects slugs when spring-loaded strippers are used. Pulled up scrap is reliably detected even with thin (up to 0.1 mm) and soft materials and at very high stroke rates.



UE - Sensors



punch breakage

die crack

## ACOUSTIC EMISSION

### detects tool breakages

Acoustic Emission detects punch breakage and die cracks when the failure occurs due to violent fracture in the tool.

This measured variable reacts earlier than conventional monitoring methods, which can prevent secondary damage.



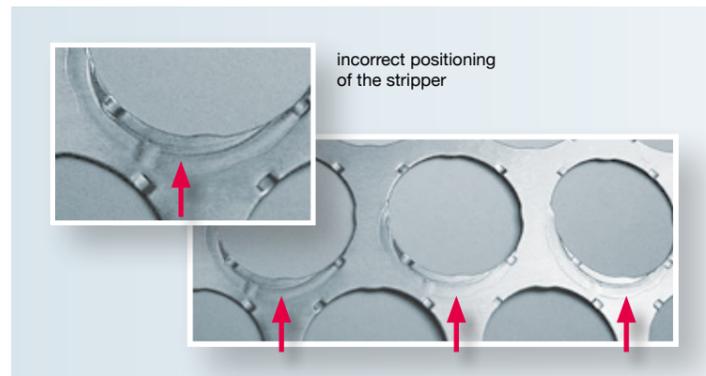
AE - Sensor

## POSITION MONITORING

### detects incorrect positioning of the stripper

With analogue distance sensors, the positioning of the stripper on the lower tool can be detected with high precision.

If the measured path is monitored with envelope curves, deviations from normal production and associated process anomalies can be detected at an early stage.

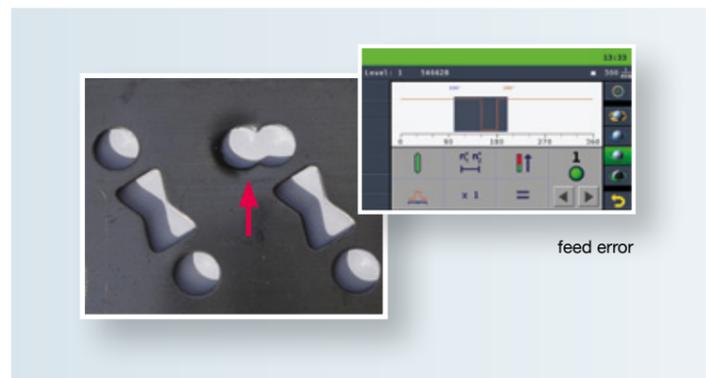


incorrect positioning of the stripper

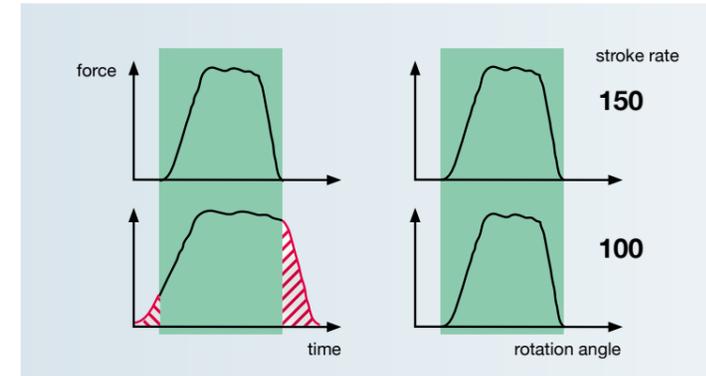
## TOOL PROTECTION

### innovative binary tool protection

Due to the exact display of the switching status of binary sensors (light barriers, buttons or switches), the limits for feed and ejection monitoring can be set easily and precisely. Optionally, up to 3 monitoring windows (X5/X7) can be set for each digital input.



feed error



## SPEEDMATIC

### speed independent monitoring

The use of rotary encoders and displacement encoders enables angular or displacement synchronous signal acquisition. The influence of the stroke rate on the signal is eliminated. Critical production phases such as press start-up can be monitored at an early stage with envelopes. Speed fluctuations have no influence on the monitoring quality.



## OPTIMIZER

### for automatic setting of the envelope sensitivity

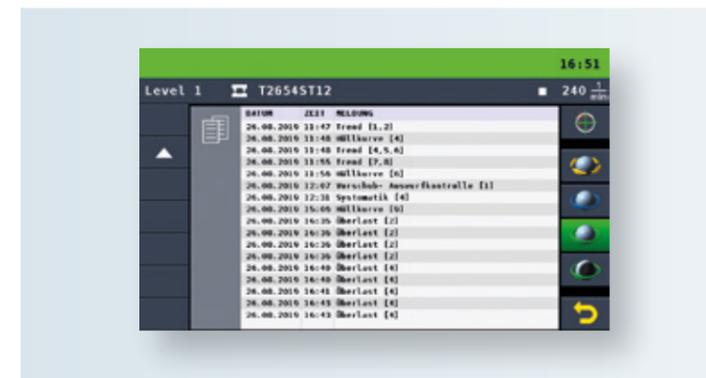
The Optimizer calculates automatically the optimal sensitivity of the envelope curve from the existing signal scatter for each sensor. The operating effort is reduced and the monitoring accuracy is improved.



## HD ZOOM

### monitoring of fault-critical process sections

Individual error-critical forming operations can be monitored additionally and more detailed with the HD Zoom. With an additional monitoring window and adapted envelope curve range, the belonging signal sections are monitored with full resolution of the entire channel (X5/X7). Sensitive forming operations can thus be optimally monitored.

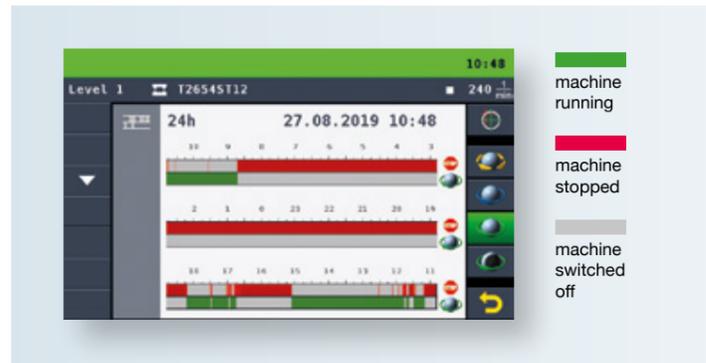


## SWITCH-OFF PROTOCOL

### for precise error analysis

Each time the machine is switched off by the process monitoring system, the date, time, subsequent downtime, tool number and reason for stopping are recorded. The X5/X7 also store the stop masks and signal characteristics in the event of an error. These data provide an excellent basis for error analysis.

# RECORDING OF RUNTIMES AND PRODUCTION DATA



## STOP & GO DIAGRAMM

documents machine runtime behaviour

The recording of the machine's runtime behaviour during the last 30 days (X5/X7 up to 90 days) creates transparency regarding productivity. The X5/X7 records not only the runtime but also the production speed of the machine.



## C-THRU4.0

networking of all manufacturing areas

- C-THRU4.0 – the intelligent networking of all monitoring devices with the production management system
- C-THRU4.0 – online recording of current production data and interfaces to higher-level ERP/MES systems
- C-THRU4.0 – makes production workflow more transparent, faster and more cost-effective

## XBROWSER, XVIEWER & TUNING BOARD

Process Data Collection - Industry 4.0

### XBrowser

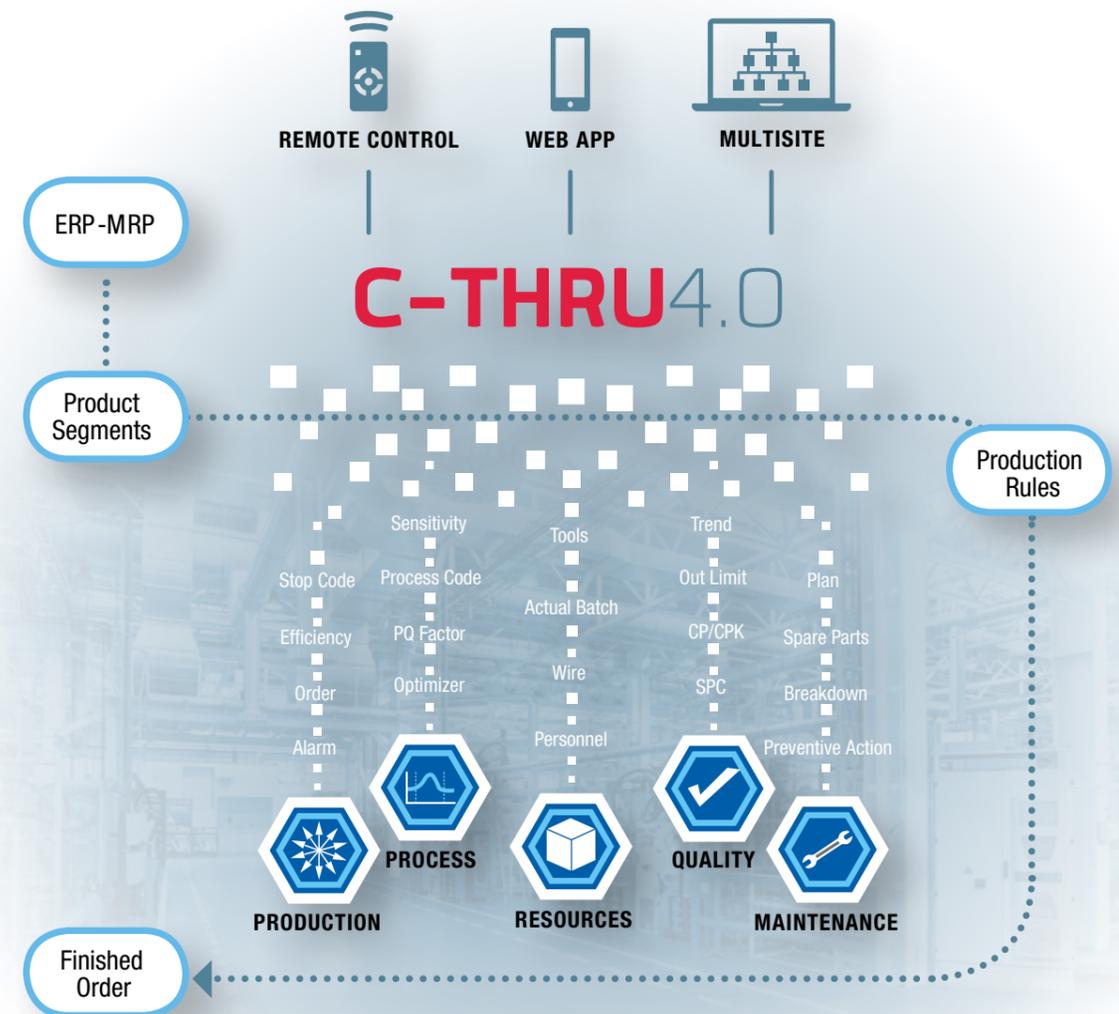
- all data at a glance
- settings of all networked devices can be controlled from the office
- tour of production is no longer necessary

### XViewer

- stored data can be recalled
- conclusions possible in the event of production problems
- behaviour of machine and tool can be evaluated more easily at a later stage

### Tuning Board

- all relevant process and monitoring data at a glance
- identify problems during production and immediately initiate improvement measures
- detection and improvement of unstable processes





[www.marposs.com](http://www.marposs.com)

*For a full list of address locations, please consult the Marposs official website*

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