MONITORING SOLUTIONS
FOR COLD FORMING MACHINES

MARPOSS

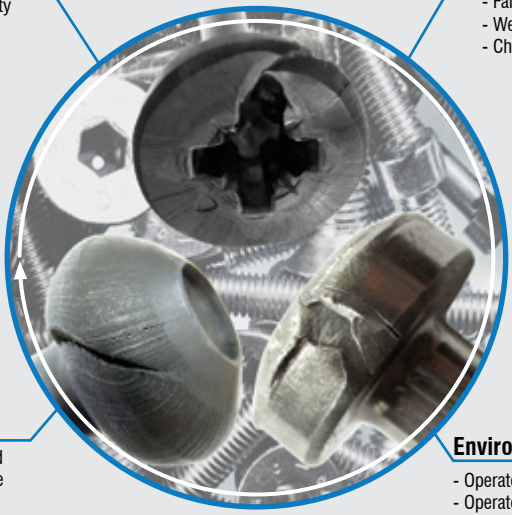
FACTORS INFLUENCING COLD FORMING PROCESS

Workpiece

- Material Ductility
- Cut off variations
- Surface quality
- Integrity
- Distortion

Tooling

- Design
- Set up
- Failure
- Wear
- Chipping



Machine

- Incorrect feed
- Forming force
- Transfer
- Maintenance
- Machine speed
- Overturning

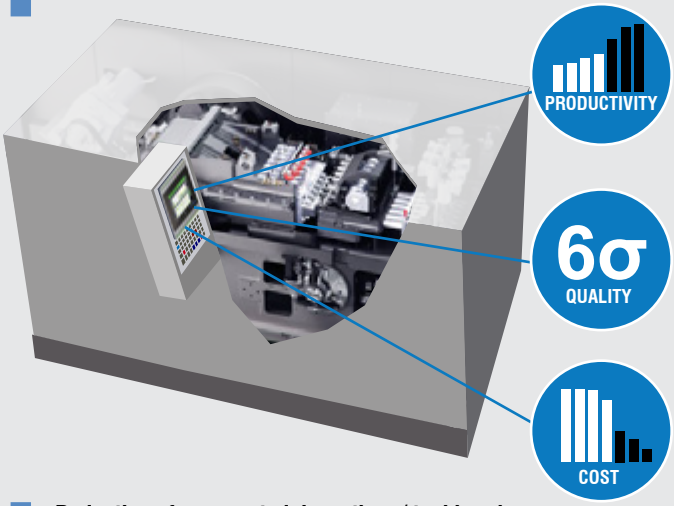
Environment

- Operator skill
- Operator presence
- Temperature
- Lubrication

Due to the many influences on cold forming processes, it is essential to carry out real-time monitoring of process parameters, part or tool variations, and unexpected events in order to optimize the process, improve part quality, machine efficiency and limit unplanned costs.

ADVANTAGES OF USING MONITORING SOLUTIONS

Productivity improvement (increased parts per minute, ghost shifts)
Machine efficiency (increased working hours, longer tool life)
Higher part quality (zero defect supply)
Machine safety (continuous conditions monitoring)



Reduction of unexpected down time / tool breakages
Scrap and return batch reduction
Reduction of set up time and repair cost
Reduction of waste

Marposs, though the acquisition of Brankamp, is the market leader of machine monitoring, offering innovative technologies for real time process monitoring on forming machines. Decades of experience in the cold forming industry plants are embodied into our systems to improve efficiency, quality and cost reductions.

Monitoring	Cold Forming Machine Type		
	Single & Double Blow	Multistation & Boltmaker	Flat & Planetary Roller
Set up aide	Short / Over feed Wire slippage Wire distortion	Short / Over feed Wire slippage Wire distortion	Die Match Vertical forces Horizontal forces
Tool Protection	Tool wear Die breakage/cracks Punch breakage/chipping Ejector breakage	Tool wear Die failures Punch failures Transfer failures Thread part rolled back	Tool wear Introduction failures Improper part positioning Thread part rolled back
Machine Protection	Overload	Overload Thread part rolled back	Overload Thread part rolled back
Part Quality	Cracked heads Cracked flange Oversized parts Undersized parts Miss-introducted parts Tool wear	Cracked heads Cracked flange Oversized parts Undersized parts Miss-introducted parts Incorrect part alignment Tool wear	Parts slippage Chip presence Incorrect process Incorrect hardening Improper introduction Improper single die match Tool wear
Machine Efficiency & Productivity	Part sorting Dosing device monitoring Ghost shifts Zero defect target Increase machine speed Unmanned production Multi machine operating	Part selection Dosing device monitoring Ghost shifts Zero defect target Increase machine speed Unmanned production Multi machine operating	Part selection Dosing device monitoring Ghost shifts Zero defect target Increase machine speed Unmanned production Multi machine operating

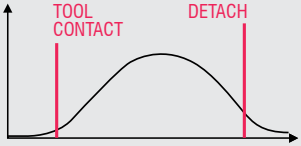
Our goal is to assist customers in achieving the highest manufacturing quality. Our units provide the key to efficient quality and process monitoring whenever hundreds of millions of parts are performed monthly. By integrating sensors near to or in the tools it is possible to nip forming problems in the bud.

Benefits

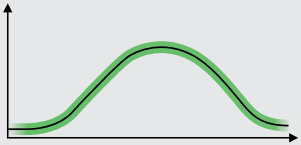
- Reduction of unexpected machine crashes, breakage, down time, repair cost.
- Reduction of set up time.
- Better analysis of process failures taking countermeasures and improving efficiency.
- Increase of production due to minor and uncontrolled process stops.
- Reduction of scrap parts targeting zero defects batches.

HOW A MONITORING SYSTEM WORKS

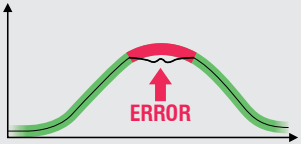
Our system learns the correct sensor signal profile for a given cycle; the unit controls, in real time, that each following process profile is nearly identical to the learned reference and that it falls within limits.



SIGNAL ACQUISITION Sensors placed in the right positions convert energy into electrical signals gauging tool and machine performances related to force applied.



TEACH-IN THE PROCESS The unit elaborates signals to automatically work out the reference envelope curve. The mathematical form and limits of the envelope represent the optimal output of a process under control.

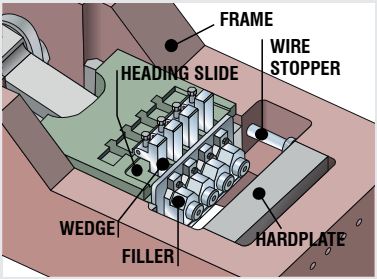


MONITOR THE PROCESS The monitoring unit observes each signal limits and compares it with the stored curve. Where the signal moves outside of the envelope, the formed part is sorted out or the machine is stopped.

If the signals match with the learned curve, the process is continuously observed, recording data for supervision of production, batch size, run-time behaviour, and process trend aiming higher line efficiency.

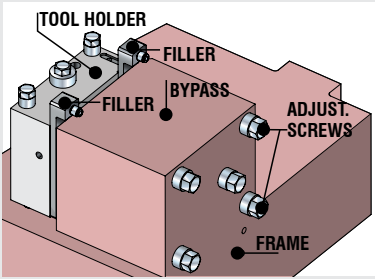
SENSOR POSITION

Machines, applications, and processes require the use of different sensors or multiple installations of the same sensor.
Regardless of type used, sensors are located where there is the best signal when machine runs.



SINGLE BLOW OR MULTISTATIONS

The sensors are installed in the hard plate, machine frame, on the wedge or at the wire stopper.



FLAT DIE ROLLER

The sensors can be integrated into the machine frame, adjustment screws, fillers or tool holder.
Ideally the sensors are integrated into the tool holder, close to the process. The process is perfectly captured inside the adjustment screws.

WORKING CONDITIONS

Wire integrity, material, contamination, short feed, cut off, clamping, tool wear, chips presence, tool cracks, part transfer - all have effect on part quality and cause unexpected machine shut down, high repair cost and delays for recovery. Trouble shooting in case of faulty conditions, and/or multiple parts inspection to eliminate contamination of batches in case of unattended processes can result in long machine stops.

Conditions	Cold Forming Machine Type				
	Set up Aide	Tool Protection	Machine Protection	Part Quality	Machine Efficiency
Single & Multistation machines	Wire slippage Wire distortion Short/over feeding	Tool wear Die failure Punch failures Transfer failure	Overload	Wire variations Punch/Die failure Incorrect process Part problems, chips	All machines: High machine speed Zero defects production Part selection Dosing device control Multi machine operating Unmanned production Ghost shift
Flat & Planetary Roller	Die Match Radial forces Vertical force	Part problems Tool wear/defect Introduction failure Thread part roll back	Overload Thread part roll back	Die match Tool wear Part position Incorrect process Part problems, chip Roll backs	

Our systems are an effective way to control your machine by detecting, right at the deformation stage, defects or abnormal conditions, thereby preventing errors, protecting machine and tools, and providing support for quick set-up.

SET UP AIDE

The system provides functions to help the operator in set up time reduction. These include constant overview of process stability, problem identification, and visualization of machine adjustments. The force measured by a sensor placed into the wire stop offers an optimum setting of the feeding mechanism, and it generates an alarm when wire feed force is out of limits.

FEEDING ADJUSTMENT

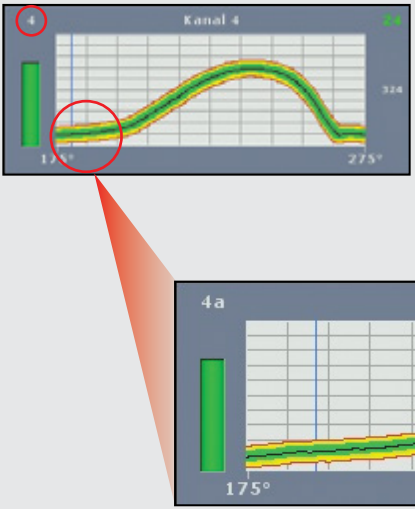
The upper curve alerts operator of overfeed force out of limit at 180° position. The curve shows where feeding mechanism generate force (A), helping position set up and optimal force within defined limits. A graphic tool to speed up setting and reduce down time.

SET UP AIDE

The unit learns and stores the optimal process which has produced good parts. The stored right force curve (1) is generated by the right tool stroke. The operator proceeds, step by step (2), to adjust tool stroke until the force signal overlaps the stored master curve (3).

TOOL PROTECTION

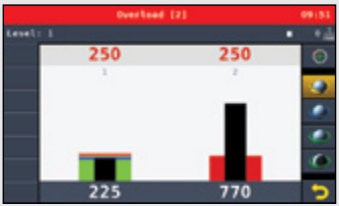
High quality components require special tooling that is an additional investment to be protected. Monitoring system filters, through the observation of the process signal profile, indicate the presence of a bad part, which could generate tool and die damage. The powerful elaborations detect the presence of unnoticeable chips, optimize tool life, reduce unexpected machine down time, and reduce the production cost and improve efficiency.



ZOOM CHANNEL Specific process areas /sections must be monitored in detail (full resolution). Optional zoom page with same number of sampling points as the entire curve ensures precise monitoring of the defined process section.

MACHINE PROTECTION

A press is a significant monetary investment to be protected from accidental or avoidable damages. The monitoring system gives a true value in kN of the loads acting in the frame of the machine at every blow. Whatever event causes the loads to exceed the limits, the system instantly stops the process and prevents further irreparable damages. Colour bar shows force status, and current loads (white values) are compared with related limits (red values). Storage of data and related distribution allows studies of production and history of overloads.



ABSOLUTE FORCE MONITORING

The current value of load In kN (white values) is compared with predefined limits (red values) and stops machine when force exceeds the limit.

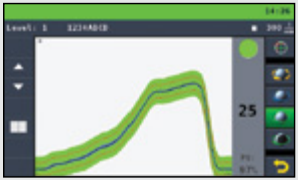
CRASH MONITORING

The continuous monitoring of fast force changes, in all machine status, is compared with dedicated limits (red values). The machine is immediately shut down when maximum force limit is exceeded.

QUALITY

High resolution monitoring systems provide accurate methods for early and reliable detection of marginal defects in pressed components (i.e. random cracks in the head or flange sections). Methods such as: double dynamic envelope curve (Quattromatic) to differentiate defect part from tool malfunctioning; auto-optimization of envelope curve width (Optimizer) to relieve operator from manual adjustment; to prevent mixing of acceptable and reject parts are functions to achieve zero-defects production and significant cost saving for defective parts investigations.

DUOMATIC Envelope created at “teach-in”. Two independent monitor limits.



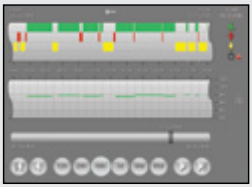
QUATTROMATIC Inner and outer limits reliably identify small and serious defects.

OPTIMIZER To generate optimum sensitivity to ensure the envelope curves at all time.

SYSTOMATIC A special option to identify permanent (systematic) process fault.

PRODUCTIVITY & EFFICIENCY

The monitoring functions optimize tooling, part check and aid the operator in rapidly fixing minor problems to assure maximum productivity with a zero-defects approach. It enables the operation of unmanned machines, including overnight shifts. The system includes sorting device control with a wide range of settings to separate good from bad parts, plus easy to use control of dosing unit. Data collection provides information on processes, machine and parts and can be delivered to remote desk for association with production data providing a snap shot profitability.



STOP & GO DIAGRAM Documentation of 24-hours of machine‘s running-time; colour bars identify operation (green), setting (yellow), stop (red).

SORTING CONTROL Separates good from bad parts. Separation, while machine runs, is possible with the control of gripper fingers.

DOSING CONTROL Easy setting of dosing parameters: box number, box size and full stop.

SIGNAL ACQUISITION

Marposs Monitoring Solutions are based on high quality signals of force, real time captured from rugged sensors placed on sensitive machine parts and tooling positions. The signals are filtered and elaborated to detect abnormal process conditions. The sensors described in the following pages are examples of a variety of solutions that the Company offers and supports users of cold forming machines.

FORCE MONITORING

Sensors specially designed to perform measures of forces deeply inside or on the surface of press elements. A full range of compact size sensors and versatility of application allow easy installation in the press where generated forces are properly correlated to press conditions under control. The high dynamic response of the sensor accurately replicates conditions generated by the process, regardless of production rate.

Marposs offers and assists users in selecting the appropriate solution among its sensors portfolio to monitor processes: strains, torsions, tensions, pressures, high frequency emissions, linear and angular displacements, true power loads, and more.

FORCE SENSORS

Sensors developed to perform directional force measurements inside or on the surface of mechanical parts of the machine. Sensors feature robustness, long life and optimal integration into the vicinity of points subject to the transmission of maximum effort. To streamline integration, these sensors are available for surface or depth measurements.

Force measure on surface. Sensors for the measure of forces which generate surface dynamic deformations. The sensor form allows fast and easy fixing in the machine.

UNIVERSAL Disc shaped sensor embedded into a framework on the surface of machine where the forming process may generate irregular stresses. Available in a variety of sizes and easy gluing fixation to enable specific targets with high precision detection.

MICRO Special sensor to detect forces having maximum effect close to machine surface. The flange assures the positioning of sensing area and rotation towards force direction.

PDA Useful to monitor loads on machine body, the sensor features fast installation thanks to single screw fixation. Suitable to be placed without machine part modification, it has a sealed cover to protect the device in hostile machine environment.

FORCE SENSORS

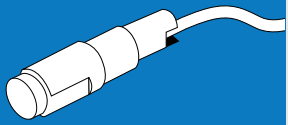
Force measure in depth. Sensors fitted and locked in a deep bore to reach the position where the force to be measured has its maximum effect.

VARIO Sensor mounted in a bore positioned perpendicularly to the direction of the force to be measured. Available for deep bores up to 450 mm and 750 mm.

XYW Sensor mounted in a bore positioned longitudinally to the direction of the force to be measured.

BENEFITS of BRANKAMP sensors

- Fast response time
- Sealed and rugged cable
- Multi-axis signal detection
- All possible mounting solutions
- Forty years of experience



SPECIAL DESIGNED SENSORS

By the integration of strain, piezo or vibration sensing elements into machine components, it is possible to create special sensors optimally fitted where process signals have maximum effect. These special sensors, in addition to our comprehensive portfolio of standard solutions, are the result of forty years of experience in the forming industry.

SMALL FORCE SENSORS IN FILLER PIECES For thread rolling or heading an integration of universal piezo membrane sensors can be done into filler pieces. Those fillers are installed very close to the forming process and deliver precise information about the process behavior.

FORCE SENSORS IN SETTING SCREWS To acquire rolling forces an integration of small sensors into setting screws or bolts is possible. They are measuring the deformation between the thread and the head of the screw.

FEED STOP SENSORS To measure the stability of the material feeding operation, special force sensors can be integrated into the wire stopper. In case of short feeds the machine can be stopped or the cut off can be sorted out.

X FAMILY

Our most advanced systems for monitoring solutions, networking, data collection, plant and production flow supervision.

X7 Up to 24 Channels 15" TFT

X5 Up to 8 Channels 12" TFT

X3s Up to 8 Channels 9" TFT

X1 Up to 8 Channels 7" TFT

PROCESS MONITORING

- Cockpit mask to visualize in a glance all process and machine flow.
- Up to 24 multi channels display and zooming capability.
- Automatic optimization of process conditions.
- Process quality PQ factor a reliable indicator of process and part quality.

OVERALL EQUIPMENT EFFECTIVENESS IMPROVEMENT (OEE INDEX)

Press efficiency, operating time, production flow and part quality rate to measure the effectiveness index. X family products feature many other functions to achieve top production efficiency :

- 90 days Stop & Go diagram of runs, set up time, and stop code memory to identify causes of time losses.
- Counters to manage production by orders/job, shift and tool.
- Batch (box) and sorting counters to control box filling and part selection.
- Ghost-shift to monitor unmanned overnight shifts production with energy saving.
- Machine protection to minimize crash effects with consequent down time and repair cost reduction.
- Process and machine status Protocol and Network integration for remote data collection and analysis.

Electronic units models		EQUIPMENT			MONITORING FUNCTIONS	
		Screen	Sensors Channels	Cabinet	Process	Production
X Top Class Enhanced High-end	X1	7" TFT Touch Screen	up to 8	Flat Stand Alone	Machine protection Monitoring optimization Dynamic envelope Long term Trend Crash	Production report (stop & go) Production Counter (Order, Total, Dose, Reject, Part sorting) Ghostshift data collection Backup Data FactoryNET® 4.0
	X3s	9" TFT Touch Screen	up to 8	Flat Stand Alone	Machine protection Monitoring optimization Dynamic envelope Long term Trend Crash	Production report (stop & go) Production Counter (Order, Total, Dose, Reject, Part sorting) Data collection Backup Data FactoryNET® 4.0
	X5	12" TFT Touch Screen	up to 8	Flat Stand Alone	Machine protection Advanced monitoring optimization Dynamic envelope Long term Trend Crash	Production report (stop & go) Production Counter (Order, Total, Dose, Reject, Part sorting) Data collection Backup Data FactoryNET® 4.0
	X7	15" TFT Touch Screen	up to 24	Flat Stand Alone	Machine protection Advanced monitoring optimization Dynamic envelope Long term Trend Process data base Crash	Production report (stop & go), Pie chart Production Counter (Order, Total, Dose, Reject, Part sorting) Data collection Backup Data FactoryNET® 4.0

X1

- Up to 12 monitoring channels with automatic calculation of amplification and monitoring window
- 7“ Touch Display with fast image refresh and high resolution
- Various, flexible counter functions
- Stop & Go diagram
- Option: data collection terminal masks ready for FactoryNET® 4.0 and PK Browser

X3s

- Up to 12 monitoring channels with automatic calculation of amplification and monitoring window
- 9“ Touch Display with fast image refresh and high resolution
- Various, flexible counter functions: order, tool, dosage, quality counter and many more.
- Stop & Go diagram shows the run-time behavior of the machine in detail
- Device protocol records date, time and reason of process failures
- Superlux: Multicolored, integrated LED warning lamp
- Option: data collection terminal masks ready for FactoryNET® 4.0 and PK Browser

X5

- Up to 24 monitoring channels with automatic calculation of amplification and monitoring window
- 12“ Touch Display with fast image refresh and high resolution
- High resolution signal acquisition (24 Bit A/D conversion)
- Various, flexible counter functions: order, tool, dosage, maintenance, shift and stroke
- Stop & Go diagram shows the run-time behavior (up to 90 days) with spm graph Device protocol records failure curves incl. date, time and reason of process failure
- Extensive tool and product storage
- Option: data collection terminal masks ready for FactoryNET® 4.0 and PK Browser

X7

- PC Frontend (Win 8) including a modular backend for larger machines
- Up to 30 monitoring channels with automatic calculation of amplification and monitoring window
- 15“ Touch Display with fast image refresh and high resolution High resolution
- signal acquisition (24 Bit A/D conversion)
- Internal RFID Reader for registration, user level-, language- and design control
- Time Machine showing the last 10 process signals
- Combi mask shows the entire monitoring methods of a channel
- Integrated, content sensitive help function
- Option: data collection terminal masks ready for FactoryNET® 4.0 and PK Browser

PROCESS DATA COLLECTION - BROWSER, VIEWER/PICKER AND TUNING BOARD

Process data in forming technology are becoming more and more important for high quality parts, e.g. for the aerospace or automotive industries. As a result, this data can be stored automatically and is available to companies for immediate and subsequent analysis.

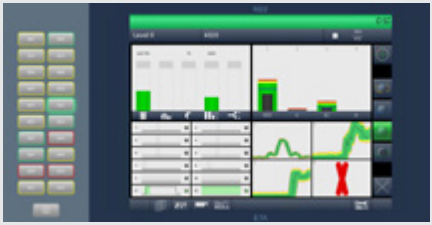
Why Process data collection?
Up to now, process data collected by the sensors displayed on the device and then deleted. Thus, they are unavailable for assessment later in case of customer complaints, for internal analysis and improvement measures. By regularly storing the process data, they can easily be found and evaluated (data, time and product number).

Applications
Process data are transmitted and stored on a server provided by the customer via the XBrowser in the event of process faults or at desired intervals. This information can be analyzed online in the office be recalled, evaluated and analyzed in the XViewer even weeks later.
With the tuning board a summery of important process data can be summarised and displayed for immediate information. This overview enables direct access to the current production situation on each machine, the setting of the monitoring and the stability and productivity of the process.

Benefits
To analyze the actual production situation the online access to each unit enables the tool room, wenn quality control department or tool design to check the machine and tool setup, process stability and global production situation.
In case of complaints after some time, the insight into the process parameters during production is lost. With Process data collection, the gap between the regular SPC controls can be closed and conclusions can be drawn about the species or the origin. In forming operations, these sensor data can only come from the existing monitoring devices.

Tuning Board

- all relevant process data at a glance
- discover problems during production and immediately initiate improvement measures
- process monitoring settings visible to all machines
- detect and improve unstable processes



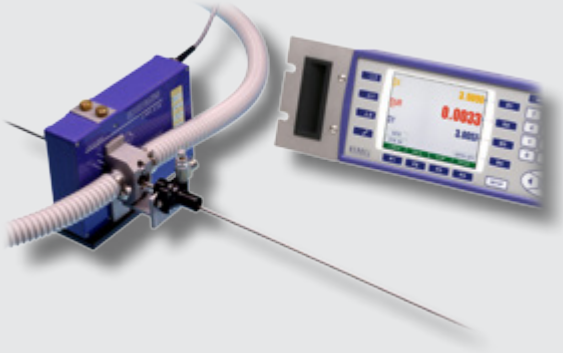
XBrowser

- all data live at a glance
- support of operators possible
- settings can be controlled and evaluated
- tour of production is no longer necessary

XViewer and Picker

- stored data can be recalled
- conclusions possible in the event of production problems
- gap to SPC tests closed
- behaviour of machine and tool can be evaluated more easily

AEROEL
Laser Technology



AEROEL, LASER TECHNOLOGY IN THE WIRE INDUSTRY
The on-line diameter measurement is performing a very important role even in the manufacturing process of a product seemingly so simple as metal wire, especially because nowadays specifications are getting tighter and tighter and more and more difficult to achieve. Aeroel has developed dedicated laser systems for real time diameter and ovality measurement, offering to wire drawers effective instruments to enhance the process efficiency and the wire quality

WHY LASERS?
Laser technology allows the wire to be gauged just after the die or before the coiling, during the drawing process. Indeed, only by using laser light it has become possible to design diameter gauges which are insensitive to wire vibration and movement, featuring in addition the extremely high precision which is necessary to check very narrow tolerance limits.

THE APPLICATIONS

By detecting increasing wire diameter or excessive ovality, the laser gauge constantly monitors the wearing condition of the die. When the wire diameter exceeds the preset tolerance limits, the machine can be immediately stopped. The measured data is recorded and processed to print complete statistical reports for each spool. In addition, the gauges can be linked to an external computer to allow remote system programming and data downloading for further analysis and storage. Several system configurations are offered, to fit both wet or dry drawing machines, single or multiple line, processing ferrous or non-ferrous wire.

THE BENEFITS

Due to the 100% inspection it is possible to achieve zero-defect production and to certify the wire quality. By avoiding drawing out-of-spec wire and by optimizing the utilization cycle of the dies, significant savings in material costs can be obtained. Finally the on-line monitoring results in saving labour costs and improving the automation of the drawing process.

WHY AEROEL?

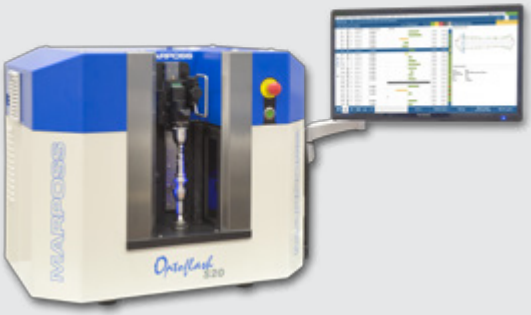
Having been established in the Wire Industry for a long time, Aeroel has extensive experience and specific know-how and is now in the position of offering a wide range of gauging systems. All of which are effective on both wet or dry drawing machines and for a number of different types of wire. In each case the favourable cost/benefits ratio always guarantees a quick investment pay back.

The unrivalled excellence of the gauges, all of them with crossed laser beams, and their long operational life enhance the benefits and make them last for the years to come.

The Aeroel measuring systems are available with accessories to guarantee suitable shielding and dust resistance; all of which have been proved to be ideally suited for on-line operation, often in heavy duty environments, succeeding where other equipment has failed.

Being one of the few European Companies working in this area, Aeroel ensures qualified technical service and products which comply with the high quality and safety standards set by the European Union.

OPTOFLASH



OPTOFLASH is a precision measuring solution based on 2D optical technology, for fast and extensive quality controls on small-size shafts and fasteners. Optoflash features an industrial grade architecture, so it is a perfect solution for the laboratory as well as for the production environment.

OPTOFLASH is the latest Marposs addition to its optical measuring systems. Designed for small-size shafts, fasteners and dental implants, Optoflash is the perfect solution for accurate quality control in the laboratory as well as in the production environment.

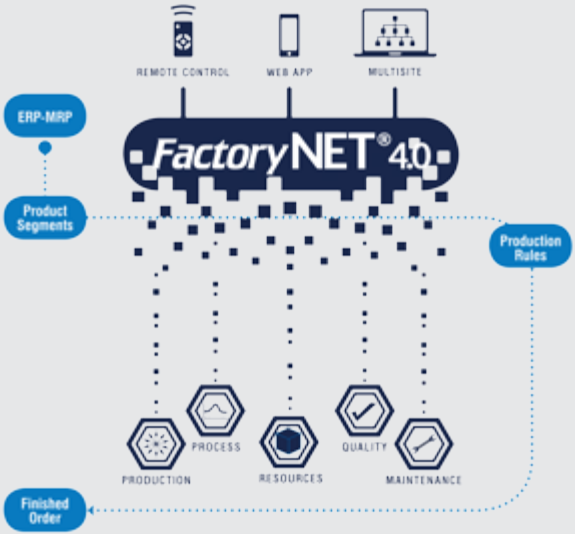
OPTOFLASH is the world first optical measuring unit - with axial range up to 300 mm - based on multiple 2D sensors in a fixed position. This means that images that are acquired by different sensors are perfectly combined together in order to generate one single resultant image of the part. This gives zero discontinuities and no gaps at the stitching edges.

With the absence of Z-axis movements Optoflash S is extremely fast and guarantees consistent and stable measurement performance over millions of cycles. The measurement cycle time is impressively fast and it can perform 100 static measurements in just 2 seconds - irrespective of how the measurement sections are distributed along the shaft length!

Thanks to its graphical user interface, anyone can use and also configure new measurements on the Optoflash. Features like smart results visuals, part detail images and graphic setups allow operator to quickly validate parts in production and also to detect the causes of non-compliances.

FACTORYNET® 4.0

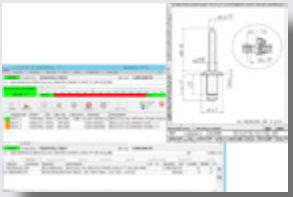
Smart Software modules for the digitalization of metal forming



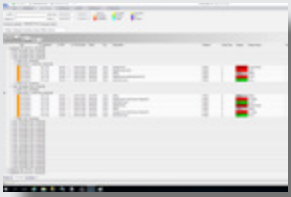
Today, competitive production not only involves recording important production data, but it also requires the rapid transmission of information. The FactoryNET® 4.0 works as a filter, allowing only relevant information to pass. Information is displayed directly on screen using a push procedure, providing the operator with a real-time overview of the current production status. Due to its integration, it is possible to send information by text message. This means, for example, that the operations manager is kept up-to-date at all times, even when he is not personally on-site. Marposs experts work closely with customers world wide in developing new products, responding to their requests and suggestions.

Modules

Production	Automatic data collection from Brankamp monitoring devices or process-involved machines. New mobile terminal input – multilingual and configurable. Planning, execution, supervision and analysis – FactoryNET® 4.0 offers an all-in-one package. Not just for the production.
Process	Live-reports of single process parameters or of entire production lines. Optimize important process parameters. Automatic process recording enabling the analysis of stops, tool wear and other process events.
Quality	Quality controls at the right time – individually and flexible with automatic recording of measurement results. Required activities due to set-up, tool changes or predefined stops will be triggered automatically. External CAQ systems can be connected directly.
Resources	Manage and localize your resources from the very beginning to the very end of the production process. Optimize set-up times by monitoring tool wear and tool stability. Manage resources – vigilance machines, articles, production times and costs with FactoryNET® 4.0.
Maintenance	User friendly. Preventive. Corrective. Minimize machine down-times by means of clever planing and prevention. Record all maintenance activities with FactoryNET® 4.0: personnel, spare part consuption, repair, duration and costs.
M-Connect	Flexible interface with third party systems (ERP, MRP, MES, CAD, CAQ, and further applications). Share of all important information (pdf files, images, instructions, audio and video) on the operator terminal.

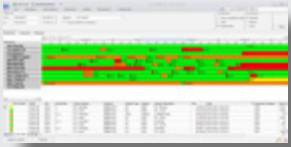


Document management

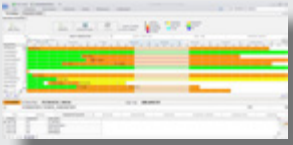


Equipment time

Network



Runtime machines



Scheduling

Shopfloor overview

T1

T1 – FN dc terminal: Compact, touch screen (7") terminal for data collection on single machines
Main features:

- Production data: counting of produced parts, machine status, material presence (idle stroke), machine speed
- Machine commands: stop / lock / release machine, switch on/off lamps,
- Operator interface: order registration / cancellation , input of stop- and/or activity codes, scraps registrations, material and tool declarations, maintenance activities, operator registration
- Connections: Native connection to Brankamp MES / Data Collection FactoryNET® 4.0.

COMPETENCE EVERYWHERE
THE CUSTOMER WORKS

A sum of factors influences product quality. The machine operator can rely on his own senses, but he does not have X-ray vision to see what is happening inside the machine and to hear whether or not the tool has malfunctioned. The operator, thus, cannot see, hear or measure everything. Sensors mounted close to the process record all process-relevant data.
When real-time analysis indicates that critical values have been exceeded, the machine can be shut down in a fraction of a second. A simple concept, yet difficult to implement in the real process. Our nearly 40 years of experience and over 50,000 Brankamp systems installed worldwide are evidence of our competence and dedication.

Marposs Monitoring Solutions - Erkrath (Germany)

The solutions are primarily used in the fastener industry, as well as in other industrial sectors, to prevent process errors, provide support for quicker machine set-up and to eliminate or limit costly damages.

The systems installed worldwide help customers to increase productivity and decrease total life cycle costs of machine tools. Brankamp systems have become an integral part of the manufacturing operations.

In order to achieve an optimum in production, the entire potential of man and machine must be put in use. Operators must be trained well in dealing with new technologies. A tool, after all, remains a tool – and it is only as good as the person handling it. Brankamp, today part of the Marposs Group, is the ideal partner to support and serve fastener industries everywhere in the world.
Marposs is present in 24 countries, with 80 offices in the world, offering specialized competence in stamping and forming manufacturing processes. Our sales and service organization, located near the customer and speaking their language, provides immediate and qualified assistance.

MONITORING SOLUTIONS