SOLUTIONS FOR 〉 PACKAGING

TQC
360°

TOTAL QUALITY CONTROL AT 360°

grafiKontrol
INSPIRED BY TECHNOLOGY

TQC360°, A NEW CONCEPT FOR DEFECT-FREE PRODUCTION AND WORKFLOW MANAGEMENT

TQC-360° is the newest modular platform for Grafikontrol's products. It has been developed to give printers a complete solution for quality assurance. With the TQC-360° concept, Grafikontrol offers a full range of quality control to the printing and converting industry through production, application, and processes and services. Our "all around" approach to the customer combines high performing products and excellent service.

The TQC-360° products integrate into any web application. Customers benefit from the modular design which allows them to start with the features they need and upgrade at any time.

The components that make up the TQC-360° line can satisfy any customer need. They can operate separately or together through a single operator interface if desired. Tailor made solutions can be designed to fit non-standard applications.

> INSPIRED BY TECHNOLOGY

Grafikontrol has been recognized as worldwide leading manufacturer of high performance equipment for the graphic industry for 50 years. We marry the best of high-tech components with the essence of Italian engineering to manufacture best of industry products with a heart "Made in Italy".

grafiKontrol
INSPIRED BY TECHNOLOGY

PRODUCTS
- WEB VIEWING
- 100% INSPECTION
- IN-LINE SPECTRAL COLOR MEASUREMENT
- WORKFLOW & WASTE TRACKING
- REGISTER CONTROLS

APPLICATIONS
- PRINTING
- REWINDERS
- EXTRUSION
- FOLDING CARTON
- METAL DECORATION
- TEXTILE
- METALIZATION

SERVICES
- REMOTE CONNECTION & ASSISTANCE
- LOCAL SERVICE
- SERVICE CONTRACTS
- 15 YEARS SPARE PARTS AVAILABILITY

PROCESSES
- GRAVURE
- FLEXO
- OFFSET
- DIGITAL
- EXTRUSION

EFFECTIVE AND INNOVATIVE SOLUTIONS FOR HIGH QUALITY PRINTING

ADVANCED PRODUCTS AND COMPREHENSIVE SERVICES FOR PERFECT PRINT

Grafikontrol develops and manufactures the most advanced equipment with state-of-the art solutions to assure packaging printers the highest print quality. The application range of the Grafikontrol systems is very wide. This applies to conventional and digital print on all substrates: metal print, extrusion, lamination, textile, and finishing.

A print line equipped with Grafikontrol press controls may include 100% print/coating inspection, register control, and in-line color measurement in order to achieve perfect results for every process: gravure, flexo, offset, and digital.

Print Inspection - During the different processes defects are automatically detected and stored in a data base, the roll map files are then used to remove the defects during the finishing phase.

Register - The print register control uses sophisticated algorithms to maintain accurate color to color register for the different press dynamic conditions.

Color - A dedicated spectrophotometer assures color consistency.

Additionally, Grafikontrol provides prompt and effective customer service via remote and local assistance backed by a post sale spare part guarantee of 15 years. For 50 years Grafikontrol has been recognized as a leading solutions provider to the packaging industry.

	GRAVURE	FLEXO	OFFSET	DIGITAL	LAMINATION / COATING	SLITTER / REWINDER
MATRIX	✔	✔	✔	✔		
MATRIX C/S	✔	✔			✔	
PARVIX	✔	✔	✔	✔		
LYNEX	✔	✔	✔	✔	✔	✔
LYNEX C/S	✔				✔	
PROGREX	✔	✔	✔	✔		
EASYTRACKER	✔	✔	✔	✔	✔	✔
CHROMALAB	✔	✔				
CR33-CR34	✔	✔			✔	

MATRIX
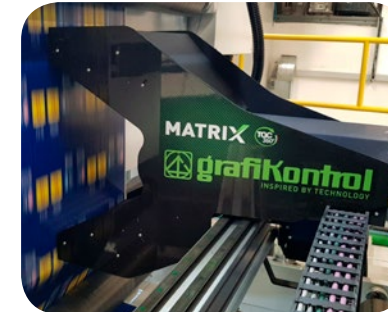
WEB VIEWING & PRINT INSPECTION

Using the latest technology, the system reproduces the image of the printed web in extremely fine detail, at full production speed. The 16X zoom allows analysis of the print details down to the dot.

- 6 Mega pixel camera resolution assures great image quality and realistic color reproduction
- LED illuminators provides a perfect light distribution for inspection on any kind of substrate, including foil
- Multi-touch monitors guarantee fluency and ease of operation
- The menu driven interface gives the operator full control of the printing functions
- Statistical print inspection
- Automatic ink deck setting (pressure and register for CI flexo)
- Barcode verification
- Δ Color monitoring
- Print repeat measurement and trend display

MATRIX C/S

FRONT TO BACK DUAL CAMERA SYSTEM FOR INSTANTANEOUS REGISTER COMPARISON

Dual Matrix camera system allows instantaneous display of front and back print for the real time verification of top to bottom register. The system instantly shows the individual images of print side and cold-seal/coating side plus a precise top + bottom overlapped image for the evaluation of the register deviation.

- Continuous scanning of the entire print repeat, through data input of job specifications, print repeat and web width
- Manual and automatic camera movement on preset selected positions
- Camera positioning via icons on the multi touch screen graphic interface
- Internet connection for remote assistance
- Real-time visualization of the front side (print), back side (cold-seal) and overlapping of both
- Optics and illuminators are custom made design to get the best performance on any kind of substrate

PARVIX

SMART WEB VIEWER

Allows to visualize in real time the printed images (with magnification of the details to dot level) with high performance and quick operations.

- "Full colour" image processing on any type of substrate by using an RGB matrix camera
- Continuous scanning of the whole print repeat
- Up to 32 camera positions storing with possibility to differentiate zoom, iris, and focus for each image
- Camera positioning via icons
- Manual and automatic camera preset in selected positions
- Internet connection for remote assistance

LYNEX

> 100% PRINT INSPECTION
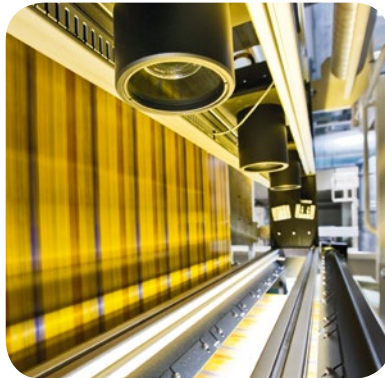
Your customer's demand for total control is satisfied by our 100% inspection. The LYNEX assures inspection of the entire print repeat, categorizing and storing every defect detected during production. The system provides this data in roll maps and generates production reports for subsequent analysis and workflow use.

- Real time process analysis, the system operates at web speed up to 1000m/min with clear discrimination of defect by size and type
- 4 K-pixel RGB linear cameras for defect detection down to 0.05 mm, on either printed or unprinted substrates
- 8 K-pixels bi-linear camera
- Job reports and Waste management
- Integration with MATRIX area camera for detailed image investigation when needed
- Real time display of the entire print repeat on a UHD wide screen monitor at full production speed

LYNEX C/S

> 100% INSPECTION FOR TRANSPARENT VARNISH & COATING

Inspection system to detect difects related to coating processes for varnish, lacquers and cold-seal.

- Clear discrimination of varnish or coating defects from the print ones
- Detection of defects by size and type
- Sensitivity adjustment for each type of defect
- Display of the defect map for each roll in process
- Quality reports for each printed roll
- Database containing 6 months of production
- Manual and automatic preset of the camera in the positions chosen by the operator
- Internet connection for remote diagnostics

PROGREX

> COMBINATION OF 100% INSPECTION + WEB VIEWING
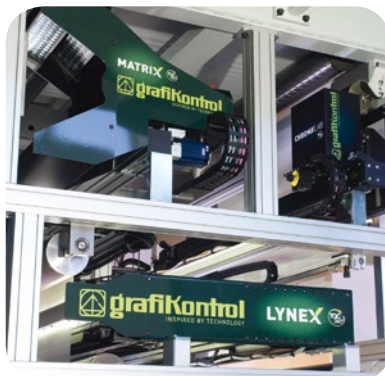
The inspection of a wide web cannot be done only with scanning or 100% cameras. Press operators need a tool that combines line scan cameras (LYNEX) and area camera (MATRIX) to guarantee total quality control and to fully satisfiy the customer request for complete process control.

- Full integration of the LYNEX 100% inspection, the MATRIX area cameras and other features are all managed by a single operator interface
- Intuitive multi-touch screen gives quick and easy access to all components and functions
- The area camera and the 100% inspection work independently: the full web inspection is not compromised when press operator uses the area camera for viewing fine print details
- The Touch&View function moves the area camera to a desired position simply by touching a point on the print repeat display screen

EASYTRACKER

> DEFECT TRACKING THROUGH VARIOUS PROCESSES, WASTE MANAGEMENT & DEFECT REMOVAL

Newest defect coding system for the traceability of the defects during the entire production process. With this system, the processing speed and the efficiency of the entire process are increased: thanks to the automatic stops in the slitter the removal of the defects is extremely easy.

- Size, shape and pattern of the sync-code are programmable
- The size of one sync-code is 2-2.5 mm by 35-40 mm (w x h) and contains Job name, Roll Number and Meterage
- The Ink Jet nozzle (to print the sync-code) is installed on a motorized bar and on the same bar is installed a sync camera that automatically detects the web edge (for auto alignment) guaranteeing a print repeatability and verifies the readability of the sync-code just printed
- The sync-camera reads and transmit the sync-code information to the system in real time for an accurate paring of the detected defects with the roll footage
- The frequency in printing the sync-code is programmable (normally is one sync-code every one or two print repeats)
- When a roll terminates the printing phase a label printer (supplied with the system) generates a label on which a univocal barcode is printed, containing all roll data.
- System is supplied with an editing station to filter the undesired defects, only the selected ones will be removed by automatically stopping the slitter on the sync-code paired with the defect

CHROMALAB

> IN-LINE SPECTROPHOTOMETER

Provides real time measurement and color correction on start-up and during production.
It can read from either dedicated color patches or the image area itself.

- Provides real time color measurements: spectral curves, ΔE, L*a*b* values, Density, Dot Gain
- Uses a motorized traverse for automatic positioning on the color bars or directly on selected areas of the image
- Quick color matching: when the measured data is out of specification to the master, the values are sent directly to the ink room where a correction dose is formulated to bring the color back into tolerance
- The system provides an accurate match with all major brands of handheld devices

CR33-CR34

> COLOR REGISTER CONTROL

The CR33 - CR34 register controls have been developed using the latest electronic and software technologies that, by selecting the best correction algorithm, reduce waste during startups, rampups, splices and re-starts.

MATRIX

STATE OF THE ART WEB VIEWING SYSTEM AND STATISTICAL QUALITY CONTROL

MATRIX is the basic component of the TQC-360° family. Its primary function is to provide the highest image quality and zoom. The 6 Megapixel color digital camera combined with the new generation of high efficiency LED illumination allow snapshots of the running web with dot-sharp images from any printing process and substrate.

The powerful hardware and the new multi-touch operator interface guarantee high performance, fast settings and quick operations. Intuitive graphics, similar to tablets, makes it easy to operate even for beginners.

Its modular design offers the ability to configure the system as the customer wants. MATRIX can act as a simple web viewer or can be expanded with multiple functions and options that transform it into a powerful quality control device.

When fully equipped, the MATRIX enables operators to detect the most common print defects, even when not visible to the human eye, and to verify the printing consistency.

SYSTEM CONFIGURATION

CAMERAS FOR ANY NEED

MATRIX is offered with a standard 3CCD digital color camera with 1600 x 1200 pixels (6 Megapixels), field of view 240 x 200 mm. In order to guarantee reliable image quality, each system is supplied with optical motorized zoom and a selection of illumination methods for the different substrates and features that the operator will encounter. Both systems use a 16X optical that allows analyzing critical areas of the image in extremely fine detail, down to the dot level.

ILLUMINATORS FOR INSPECTION ON ANY SUBSTRATE

With MATRIX, Grafikontrol is on our fourth generation of LED illumination. These new modules are much more powerful and allow even light distribution for any substrate. Special attention has been given to the optics required to inspect metalized substrates (front printing or cold-seal). The LEDs ensure constant light over a practically unlimited lifetime.

MAXIMUM UPTIME WITH MINIMAL EFFORTS

The user-friendly interface associated with intuitive graphics and our multi-touch features ensure a fast learning curve and impressive immediacy in initial set-ups and adjustments during the job run. With simple finger gestures the operator easily selects screens or functions. The system operates with a multi-touch non-glare 24" HD 16:9 monitor.

MULTI-TOUCH OPERATOR INTERFACE

SYSTEM FUNCTIONS

- Continuous Scan: autoscan inspection of the entire print repeat.
- Stored Points: the camera moves to pre-programmed areas of the print.
- Image Stabilizer: the image on the screen will be steady thanks to sophisticated software algorithms.
- Print Repeat Tab: virtual reconstruction of entire print repeat allows the operator to control the camera positioning.
- Split Image: allows a quick live/master comparison of the image.
- Quick-Zoom: "pinch-zoom" function allows a quick magnification of the image detail.
- More Controls: the basic system can be expanded with additional software and features such as:
  - Statistical Sampling Inspection
  - Interactive Register© "click&drag"
  - K-register 2.0 (automatic pre-register)
  - Barcode Verification
  - Δ Color Monitoring to give complete control of color consistency during the print phase
- Total Quality Control: MATRIX can be easily integrated with the LYNEX 100% Inspection. This upgrade offers complete control of your production runs and maximizes your quality standards.
- Remote Support: the system is configured with a dedicated VPN connection for remote support by our trained technicians.

FUNCTION
SELECTION

OPTIONAL FEATURES

- During the printing process the quality of the product can be affected by intrinsic or external factors that cause random flaws. A simple web viewing system is not sufficient to catch these defects. Thus continuous inspection of the printing is necessary in the modern and efficient production environment. With a single touch, MATRIX automatically starts the comparison of the live print with the stored reference image. The entire print repeat will be continuously inspected with pre-determined sensitivities and speed.
- The operator can set individual sensitivity for each type of defect according to your quality requirements. Each time a defect is detected the system will acoustically warn the operator displaying the relative image. The usual defects are ink splashes, print starvation, streaks, misregistration, color variation, hazing, scumming, washout, and foreign object contamination.

STATISTICAL
INSPECTION

STATISTICAL
INSPECTION

- During production, if the operator misses a defect because he was busy with other duties, he can recall the defect gallery screen. Here we picture the last 12 detected defects. For each defect the system stores data relative to type, size, position and time.
- Defect maps are automatically generated for each printed roll. The defects are represented with different shapes, sizes and colors according to the type and dimension. The roll maps are stored in a data base for immediate or future review.

DEFECT ANALYSIS

- This software allows in-line inspection on 1D and 2D codes ensuring rapid intervention by the operator when any of the Barcode are out of standard tolerances. The area camera periodically verifies the Barcodes printed in different locations and the relative data are displayed on a wizard. An alarm (red light) indicates out of tolerance from the reference as set by the operator according to job requirement.
- Each Barcode is inspected with particular accuracy according to ISO 15416 and ISO 15420 to guarantee readability when the product is scanned by Barcode readers.
- The classification for each scanned code is displayed in real time. No special settings are required since the software automatically adapts itself to the codes direction, size and type.

BARCODE
VERIFICATION

BARCODE VERIFICATION AND GRADE

BARCODE SENSITIVITY ADJUSTMENT

Δ-COLOR MONITORING

- Maintaining the color during the printing for an entire run is probably the most critical task. For each different printing process, the color can be affected by changes in printing pressure, viscosity, temperature, substrate homogeneity, press speed change, and ink transfer.
- The Δ-Color Monitoring performs continuous comparison between the standard CIE L*a*b* values, acquired during printing, with those approved and mastered at the beginning of production.
- For each job the system allows up to 40 different camera positions for color measurement. The positions can be set for measurement within the image or from dedicated color patches.
- The ΔE tolerance is set by the operator according to job requirement. Individual tolerances can be set for each measuring point.
- An alarm indicates deviations from the reference values in ΔE. This gives the operator advance warning to adjust color before it reaches levels that could compromise the image quality.
- For every measurement, the color trend and the various deltas (Δe CIE Lab, Δe CMC, ΔL, Δa, Δb) are represented on color space graphics.

COLOR TOLERANCE SENSITIVITY ADJUSTMENT

## INTERACTIVE REGISTER© / REGISTER PRESETTING FOR CI FLEXO PRESSES

- The Interactive Register© ¨click&drag¨ is a revolutionary function for CI flexo presses, this is the best preregistration system available without dedicated marks. The function is mainly used during a job start-up with the press stopped, thus producing minimum waste.
- This software allows the operator to interact with the image displayed on the screen. A snap-shot is taken of the printed image which contains all the colors to be corrected. As a reference, the operator can use the plate alignment marks which are available for every individual color. By simply touching the reference points, the system calculates the shift among the X-Y coordinates of all colors and performs all the corrections in few seconds.
- In the presence of dedicated register marks, the system performs the pre-register automatically without stopping the press and without operator intervention. This operation allows a further reduction of start-up waste.
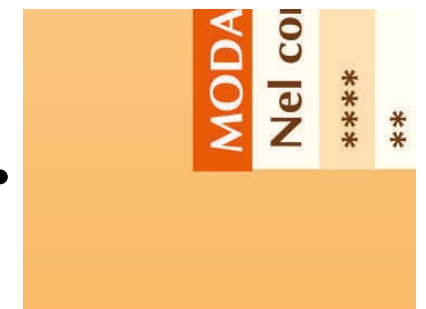
INTERACTIVE REGISTER© ¨CLICK&DRAG¨

K-REGISTER 2.0, FULLY AUTOMATIC PRE-REGISTER USING MICRO-RINGS

- K-Register 2.0 is a fully automatic register control for CI flexo presses. A series of Ø2 mm dots are printed by each color. These are automatically registered without any operator intervention during the job start up. When all colors are in register the dots are exactly overlapped and are seen as a single dot.
- This function can be supplied as an optional software routine integrated into the MATRIX camera or in the case of high value substrates, as an independent device installed before the dryer.
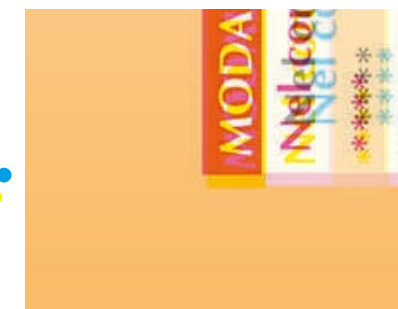
INITIAL MIS REGISTRATION   REGISTRATION AFTER AUTO CORRECTION

PRINT REPEAT MONITORING

- This feature is highly important when you are printing extensible substrates and the length repetition of the product must be accurately controlled to avoid rejections during the post-press processes.
- The operator can set different tolerances according to type of substrate and product specifications. An alarm is activated when the print length exceeds the tolerance.

DEDICATED ILLUMINATORS FOR SPECIAL APPLICATIONS

- Certain substrates or particular inks and varnishes are difficult to inspect with the standard illumination. Therefore, Grafikontrol designed special illumination methods that guarantee clear visualization of these difficult materials during the print run.
- The special lighting effects can be supplied for a dedicated purpose inspection or they can be added to the standard illuminators for selection as needed.

INSTANTANEOUS VISUALIZATION OF FRONT AND BACK (COLD SEAL) PRINTING

MATRIX C/S is a dual camera system that allows instantaneous display of the front and back of the print for verifying the register overlap. The equipment is composed of two opposite digital monochrome matrix cameras (1,3 Megapixels) with fixed magnification which move synchronously on 2 cross beams, controlled by a single motor. The system is equipped with polarized optics with geometry designed on Grafikontrol specifications, particularly designed for the inspection of metallised substrates. The LED illuminators used on the MATRIX C/S system belong to the fourth generation, more performing and efficient, able to guarantee better light distribution on any substrate.

The combination of optics and lighting has allowed us to obtain the best performance in terms of visualization of the transparent lacquers, varnishes and cold-seal on any substrate. A special "image enhancement" feature improves image contrast on both sides of the web. The system instantly shows the image of the cold-seal superimposed and synchronized with the image of the front print for a precise evaluation of the out-of-register of the cold seal.

"Out of register alarm" - It is a dedicated software (optional) that allows you to warn the operator when the register between front (print) and back (cold-seal) exceeds the set tolerances.

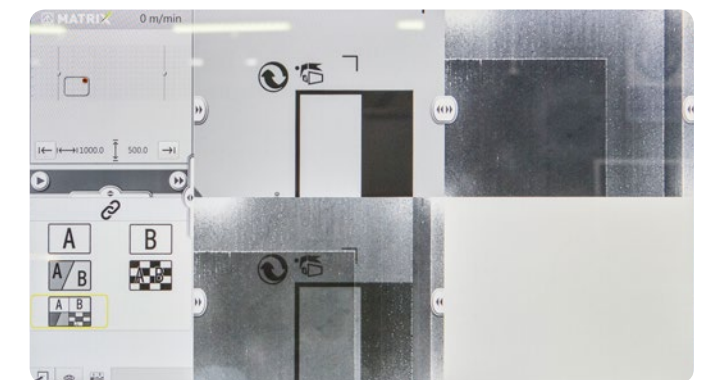## SYSTEM CONFIGURATION

PRINT SIDE

COLD SEAL / COATING SIDE

FRONT AND BACK IMAGE SUPERIMPOSED

MULTI-VIEW SCREEN

- Continuous measurement of the entire print repeat, detection of longitudinal and transverse register variations.
- Manual and automatic preset of the camera in the positions chosen by the operator.
- Camera positioning through the use of icons on the multi-touch screen graphic interface.
- Internet connection for remote diagnostics.
- Real-time visualization of the front side (print), back side (cold-seal) and overlapping of both

> SMART WEB VIEWER

PARVIX, is equipped with a 1,3 Megapixel digital color camera that allows to display a 150x110mm field of view on a 24" multi-touch monitor. The high-brightness optics equipped with 10X motorized zoom combined with the newest generation of high efficiency LED illumination allow snapshots of the running web providing the operator with clear and dot-sharp images of all printing process and substrate. The 10X motorized optic enables to display the printed images with magnification of the details to dot level. The powerful hardware and the new HD multi-touch operator interface guarantees high performance, fast settings and quick operations. Intuitive graphics, similar to tablets, make learning operations simple and intuitive even for beginners.

PARVIX acts as a simple web viewer but the modular design offers the opportunity to configure the system as the customer wants.

> SYSTEM CONFIGURATION
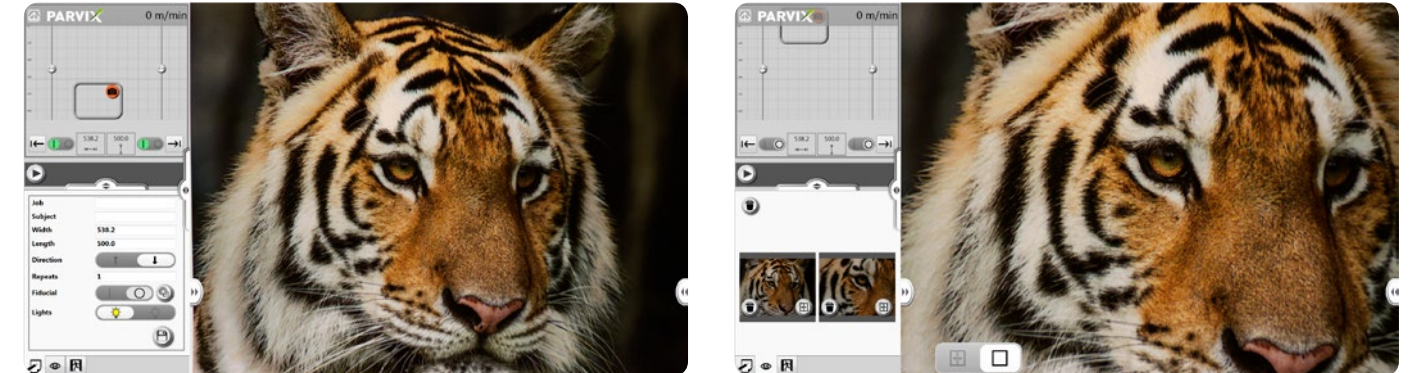
INTERACTIVE REGISTER (CLICK&DRAG) SCREEN

- "Full colour" image processing on any type of substrate by using an RGB matrix camera.
- Continuous scanning of the whole printing size, through data input of job specifications, print repeat and web width.
- Up to 32 camera positions storing with possibility to differentiate zoom, iris, and focus for each image.
- Camera positioning via icons on the multi-touch screen graphic interface.
- Manual and automatic camera preset in selected positions.
- Pre-settable zoom, iris and focus via multi-touch screen.
- Internet connection for remote assistance.
- The basic system can be expanded with Click&Drag Interactive Register© revolutionary function for flexo machines that allows performing pre-registration for all the printing deks without dedicated marks. The software allows the operator to interact directly with what is displayed on the screen, which is a snapshot of the image printed with all the colors to be corrected. The function is mainly used during a job make-ready, with the machine stopped, so as to minimize waste.

100% PRINT INSPECTION. THE GUARANTEE FOR TOTAL QUALITY CONTROL
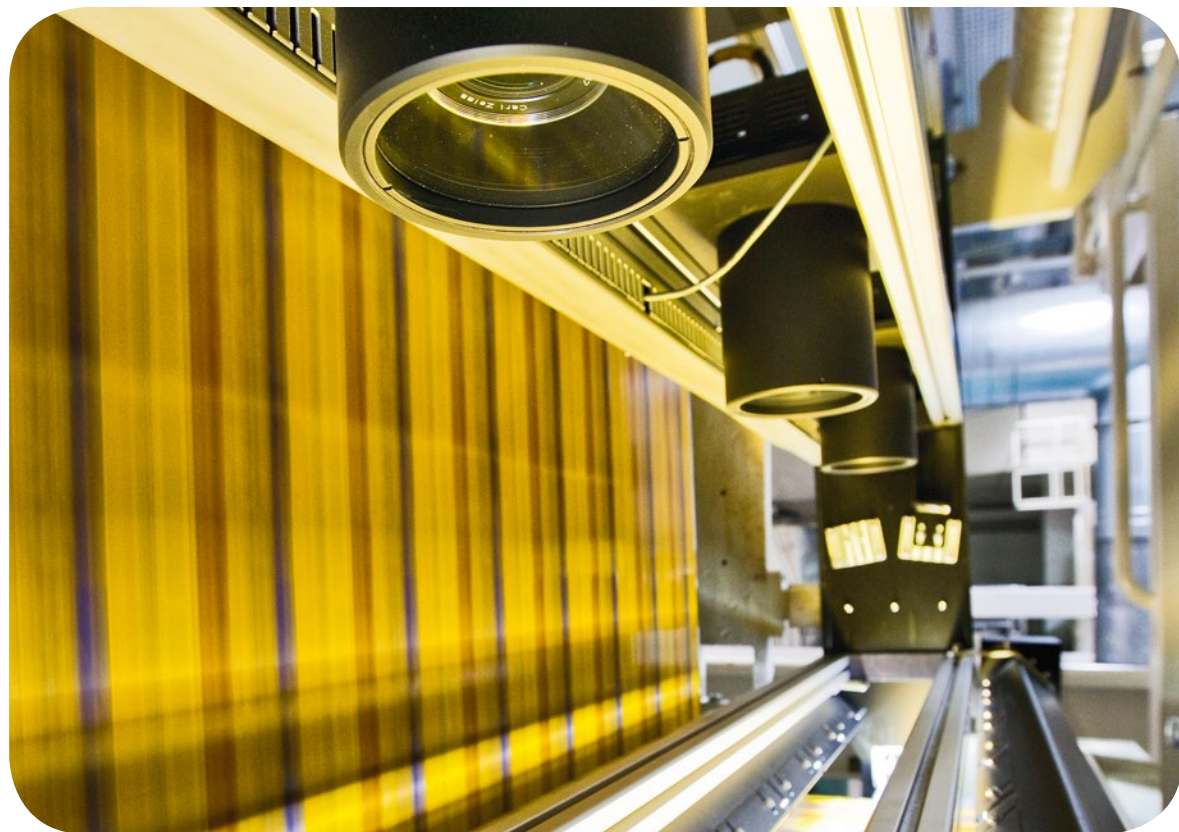
In roll-to-roll packaging printing the demand for defect free product and tight regulations obligate printers to equip their presses with systems that can guarantee a total quality control. This avoids embarrassing situations with your customers that can result in costly reprints or monetary credits. LYNEX is a 100% print inspection developed by Grafikontrol to assure the total quality control during the printing process. The continuous inspection of the entire print repeat, with programmable sensitivities, allows the automatic detection of all print or substrate defects and a real time evaluation of the production. The immediate

warning, when a flaw is detected, guarantees the elimination of defective material which optimizes your process and avoids claims. The modular architecture, combined with powerful hardware and dedicated algorithms for image processing, make the LYNEX a flexible and easy to use instrument for inspection on gravure, flexo and offset presses. It is possible to set quality standards based on customer needs and specifications. LYNEX can operate as stand-alone module in multiple processes, as a print or substrate inspection device, or in combination with the MATRIX.

> SYSTEM CONFIGURATION

HIGH SPEED LINEAR CAMERAS

LYNEX combines one or more 4K-pixel RGB linear cameras for an accurate real time inspection of the entire web width at production speeds exceeding 1000 m/min. A version of the system with 8K-pixel bi-linear cameras is available for applications on laminators, slitter machines, doctoring machines and narrow-web printing machines. The information from the cameras is processed through powerful hardware to provide accurate and reliable image inspection. Additional linear cameras can be dedicated to inspect the printed surface for the detection of defects down to 0.1 mm.

INDIVIDUAL DEFECT SENSITIVITY ADJUSTMENT

REAL TIME FULL PRINT REPEAT DISPLAY

LYNEX provides as standard the real time display of the entire print repeat. Grafikontrol's dedicated image processor displays the live image at EVERY REPEAT as a full web viewer on a 32" or 55" UHD monitor The operator can analyze the print conditions on the whole web and immediately intervene as needed. When a defect is detected the relative position is highlighted on the screen.

MODERN MULTITASKING USER INTERFACE

"Easy and efficient" are the best terms to describe the new LYNEX operator interface. Press operators will not struggle to learn how to use the system functions.
The gestures and actions are the same common ones used in smartphones and tablets. LYNEX is operated through a standard 24" HD 16:9 multi-touch screen. Operators can navigate from screen to screen by just touching or sliding the image.

SYSTEM FUNCTIONS

1	PRODUCTION DATA	
2	PRINT REPEAT MONITORING	
3	BARCODE VERIFICATION AND GRADE	
4	Δ-COLOR MONITORING	
5	ROLL MAP	
6	HAZING	
7	COLOR DEVIATION	
8	DOCTOR BLADE/STREAKS	
9	INK SPOTS	
10	INSECTS/FOREIGN MATERIAL	
11	COLOR MISSING/DRYING	
12	SENSITIVITY SETTING	

DIGITAL ZOOM

DEFECTS GALLERY AND DEFECT DETAIL

- Digital Zoom: 6X digital zoom allows the operator to digitally zoom on certain details over the entire print repeat by using the full print repeat monitor.
- Gallery of Defects: the chronological sequence of the defects and a scrolling function provide easy evaluation of the process.
- Different Sensitivity Levels: the operator can define the sensitivity for each classification of defect according to the job specification.
- Masking: undesired defects which cannot be removed from the printing, can be completely masked to avoid constant alarms.
- Job Report & Statistics: for the total traceability of waste the system produces a defect map for each printed roll showing in chronological order the defect, its coordinates and a visual image for the reviewer.
- PDF/LIVE Master Comparison: this software, used during a job make-ready, allows an easy and quick comparison of the live printing with the relative PDF pre-press file to check for any differences. The in-line comparison is of big help when printing different text languages or to detect faulty engravings.
- Δ-Color Monitoring: through the live print repeat tab displayed on the multi-touch screen the operator can easily select up to 24 points of measurement to monitor the color trend. The ΔE values are continuously updated and visualized.
- Barcode verification: this function is distinguished by its ease of use. It simultaneously finds and verifies all the Barcodes within the image (both 1D and 2D). The software automatically adapts itself to the code's direction, size and type and indicates if the code is out of tolerance from the reference. The software grades the Barcodes according to ISO 15416 and ISO 15420 specifications. This function requires that the LYNEX is supplied with a resolution ≤ 0.08 mm/pixel.

STATISTICAL PRODUCTION DATA

Δ-COLOR MONITORING

LYNEX C/S

> 100% DEFECT INSPECTION FOR TRANSPARENT VARNISHES AND COATING

> SYSTEM CONFIGURATION

VIEWING OF FRONT AND COLD SEAL SIDE

LYNEX C/S is a 100% inspection system dedicated to detecting defects related to coating processes for varnish, lacquers and cold-seal. Equipped with 4K monochromatic linear cameras, the system allows the user to check the correct printability of varnish/lacquers and cold-seals, detect defects in the substrate, categorize them according to the different types and create individual reports for a subsequent quality control.

The system is equipped with polarized optics designed on Grafikontrol specifications, particularly designed for the inspection of metallised materials.

The LED illuminators used on the LYNEX C/S system belong to the fourth generation, more performing and efficient, able to guarantee better light distribution on any substrate. The geometry of the optics and illuminators combined with the detection angles of the cameras made it possible to obtain the best performance in terms of visualization of the transparent lacquers, varnishes and cold-seal on any substrate. A special "image enhancement" feature improves image contrast on both sides of the web.

The LYNEX C/S can be integrated with the 100% LYNEX inspection system installed on the print side, improving inspection performance in a unique and unrepeatable way, offering real-time control / visualization of the job on both sides of the web. Both sides of the web are displayed individually on 24 "multi-touch monitors and at the same time the images for front and back side of the web are shown superimposed on a 32" or 55 "UHD monitor so as to have information in real time on the quality of the job. A special "image enhancement" feature improves image contrast on both sides of the web.

- Fixed pixel resolution: 0.2x0.2mm run&cross direction.
- Digital zoom.
- Black and white image processing on any type of substrate through the use of 4096 pixel monochrome cameras.
- User-friendly graphics interface.
- Detection of defects by size and type.
- Sensitivity adjustment for each type of defect.
- Display of the defect map for each roll in process.
- Quality reports for each printed roll.
- Database containing 6 months of production.
- Connection to the company network for production management (optional).
- System can interface to the press using contacts to automatically control the waste devices.

> INTEGRATED SOLUTION FOR 100% PRINT TOTAL QUALITY CONTROL

> SYSTEM CONFIGURATION

SMART INTEGRATION FOR QUICK OPERATIONS

The software offered with MATRIX and LYNEX are integrated into the PROGREX for a complete quality assurance package. Intuitive and modern graphics are combined with the multi-touch screen reducing the time for system set-up to only a few seconds.
Print Inspection, Pre-Register, Barcode Verification, Δ-Color monitoring, and PDF to Live Master Comparison, all are integrated into the system framework and can be immediately activated from a single operator screen.
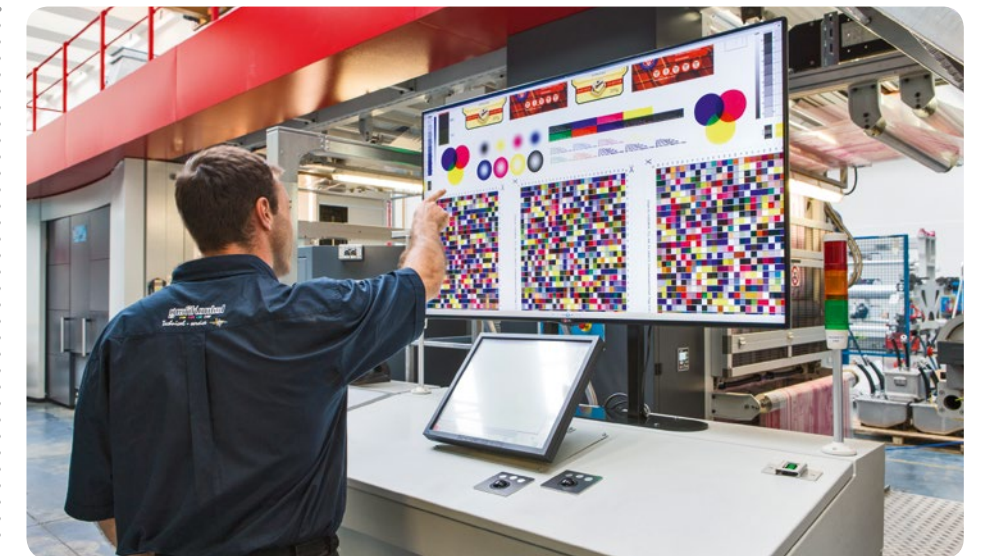
COMBINED OPERATIONS FOR BETTER INSPECTION

PROGREX uses the capabilities of the LYNEX 100% inspection and the MATRIX area cameras to give the printer the highest quality standard possible. Unique features developed by Grafikontrol are available:
• Click and View: touching any point on the 100% Print Repeat monitor drives the area camera to the coordinates and zooms the image with a programmed magnification, speeding up the operation.
• Double Inspection: while the LYNEX operates on the 100% of the web with certain defect sensitivities you can set the MATRIX to higher sensitivity to inspect critical points (examples: logos, color tones, register). The defects are combined on the same roll map.

DEFECT TAGGING, REMOVAL AND WASTE MANAGEMENT

PROGREX provides two levels of waste management depending on customer requirement.
"Waste tagging" is the basic solution which automatically marks the waste portion on the substrate during the printing. The system provides a trigger output that can be used for any marking method selected by the customer such as flagging, spray nozzle, or inkjet. In folding carton printing this function can automatically activate the waste gate.

PROGREX is Grafikontrol's solution to achieve high quality standards. The combination of the different technologies, linked to image processing algorithms, provides a complete and simple instrument to support the operator. The solution combines two high end technologies in one single system:
• LYNEX for the 100% inspection of the entire web with full print repeat display

• MATRIX area camera for an accurate visualization of the details
These parallel functions allow control of the printing process from a single user interface. The interactive functions between the two systems make PROGREX the most ergonomic inspection equipment on the market today.

VIEW OF THE ENTIRE PRINT REPEAT IN REAL TIME

EASY**TRACKER**

› WASTE MANAGEMENT & DEFECT REMOVAL

EASY-TRACKER is the newest defect coding system for the traceability of the defects during the entire production process (printing, lamination, slitting).

The use of innovative hardware and software, entirely developed by Grafikontrol, allows an accurate removal of defects in the slitting phase.

In the first working process a variable code (sync-code) is printed with an INK-JET marker at regular intervals on the roll web edge; the sync-code contains the printed roll data: job number, roll number footage. Whenever a defect is detected by the 100% inspection system (PROGREX / LYNEX) its position on the web length is immediately paired with the closest sync-code. At the end of each produced roll the system generates a data-report containing all the detected defects and the associated sync-codes.

The purpose of EASY-TRACKER is to track all the defects detected during the different processes (printing, coating lamination etc.) and save them in a data file.

An editing station allows the quality control to discriminate and filtering the different typology of defects according to customers' requirements (criteria).

After the editing phase, the roll moves to the final machining process where the selected defects will be removed.

With this innovative system, the processing speed and the efficiency of the entire process are increased, thanks to the automatic stops in the slitter the removal of the defects is extremely easy.
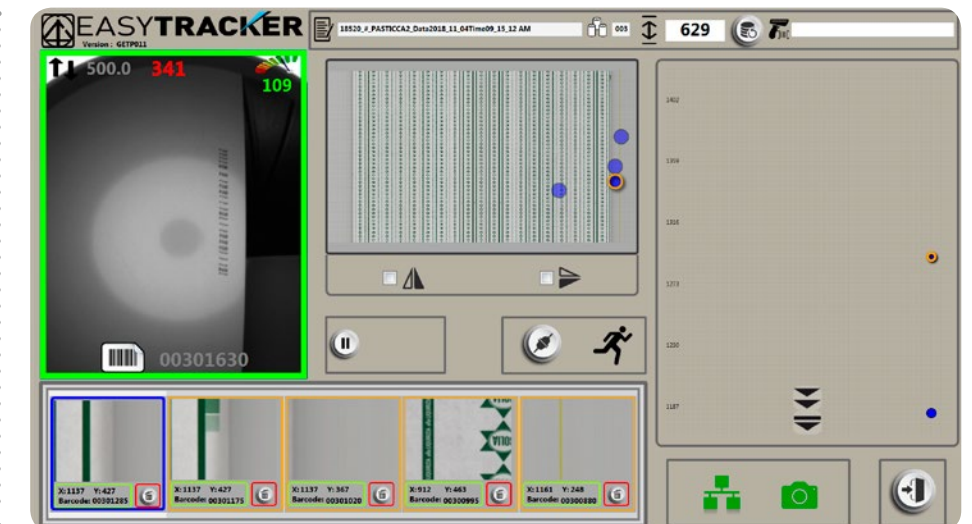
› SYSTEM CONFIGURATION

PRINTING PROCESS

DEFECTS ARE PAIRED WITH SYNC CODES
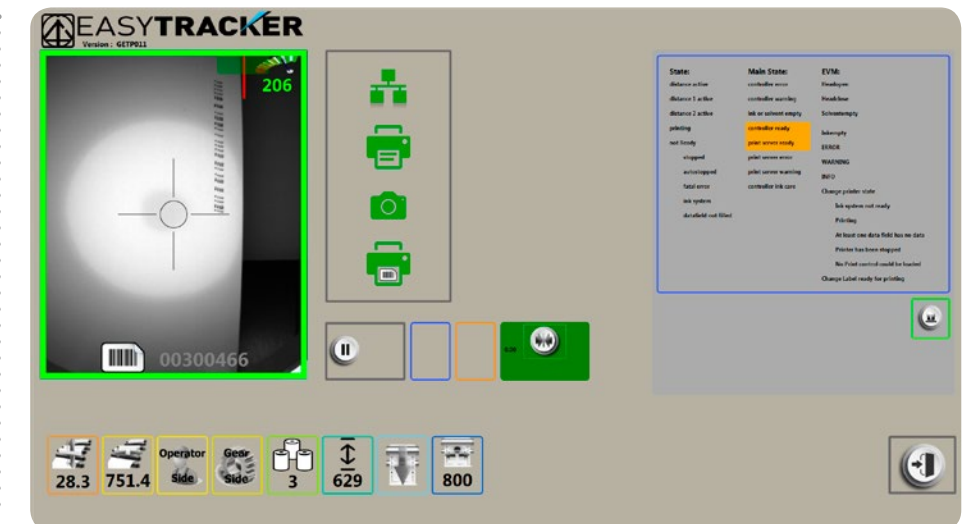
SLITTING PROCESS

DEFECTS ARE REMOVED FROM THE ROLL. SLITTER STOPS AUTOMATICALLY ON THE SYNC CODE PAIRED WITH THE DEFECT

- Size, shape and pattern of the sync-code are programmable.
- The size of one sync-code is 2-2.5 mm by 35-40 mm (w x h) and it contains Job name, Roll Number and Meterage.
- The Ink Jet nozzle is installed on a high precision motorized bar. On the same bar, aligned with the nozzle, is installed a sync-camera that allows to automatically detect the web edge (for auto alignment) guaranteeing a print repeatability in case of web movement and verifying the readability of the sync-code just printed. For the following processes (lamination, coating, slitting) the motorization is optional.
- The sync-camera reads and transmit the sync-code information to the 100% inspection system in real time (every impression) for an accurate paring of the detected defects with the roll footage.
- The frequency in printing the sync-code is programmable and normally is one sync-code every one or two print repeats.
- When a roll terminates the printing phase a label printer (supplied with the system) generates a label on which a univocal barcode is printed. The barcode contains all the data relative to the roll: press number, production date, time, roll number. The information contained in the barcode are necessary to follow the roll during the processes following the printing.

IN-LINE SPECTRAL COLOR MEASUREMENT
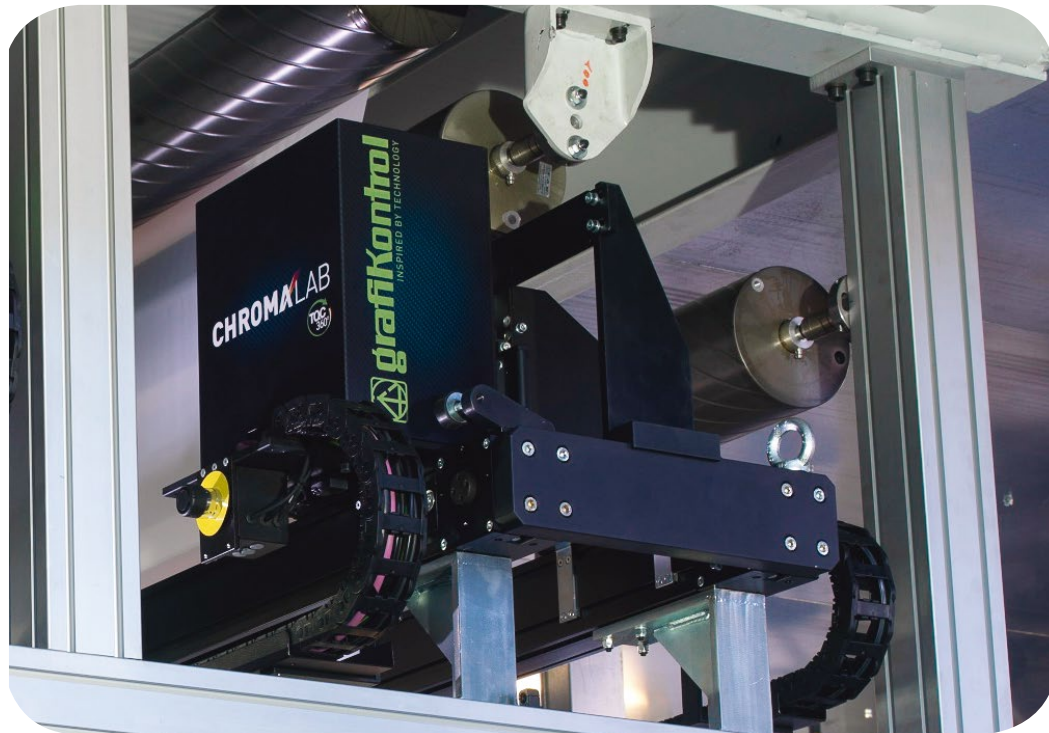
In the pressroom environment one of the most common causes of color management issues stems from material fatigue. Whether it is a doctor blade that wears, a plate that needs to be changed or an anilox that needs to be replaced. When any of these pieces of equipment change over time, eventually it will affect the color. It is well known that brand owners adamantly want harmonization of their colors across all substrates, applications and geographies, to communicate brand equity to consumers worldwide. For this reason an accurate color measurement during production is extremely important to guarantee consistent, high quality output.

The CHROMALAB, in-line color measurement, allows real time precise evaluation of color providing immediate warning when color trend exceeds the tolerance so the operator can take immediate action for correction. Using exclusive software, CHROMALAB analyzes spectral variations in color measured on the print, the "Δ-color spectral data" can be used to feed an ink dispensing system for perfect correction of the ink formulation. CHROMALAB's automated measurements reduce start-up waste by hitting the customer's color standards much faster. CHROMALAB provides more detailed and more accurate color monitoring.

> SYSTEM CONFIGURATION

- Provides real time color measurements: spectral curves, ΔE, L*a*b* values, Density, Dot Gain.
- Uses a motorized traverse for automatic positioning on the color bars or directly on selected areas of the image.
- The spectrophotometric sensor is aligned with an area camera to help the operator find the image/color patches to measure.
- Quick color matching: when the color values are out of specification to the approved sample, the data relative to the difference can be used by an ink dispensing system where a correction dose is formulated to bring the color back into tolerance.
- The system provides an accurate match with all major brands of handheld devices.
- Measures up to 16 colors across the web; color measurement can be made on color patches (automatic pattern recognition) or directly from the printed image on any type of substrate.
- CHROMALAB has been designed to fit on flexo and gravure presses.
- Provides On-line, absolute color values which are correlated with color measurements made off-line by the press quality assurance departments and/or by the end customers.
- Charts & Graphs are stored for future evaluation and can be seen in real time from remote location or tablets.
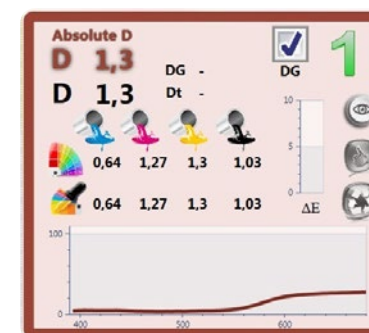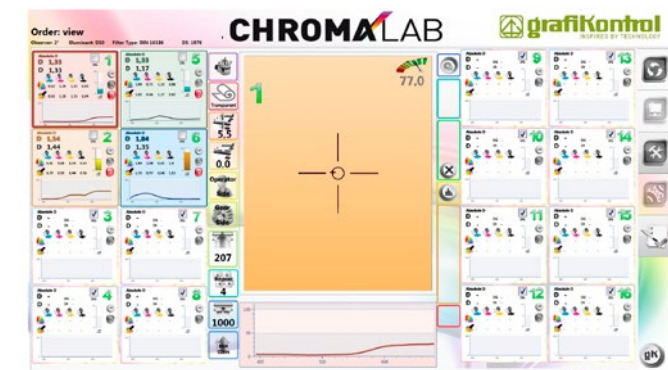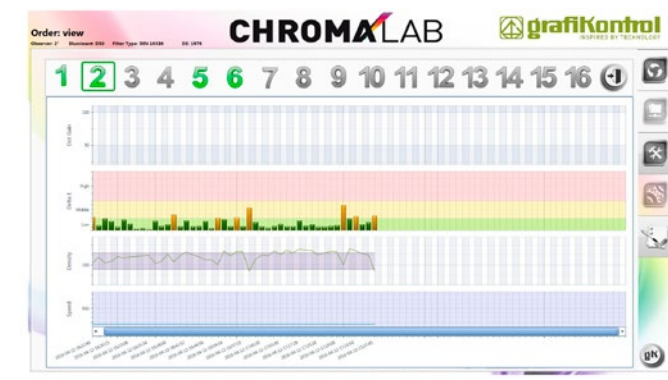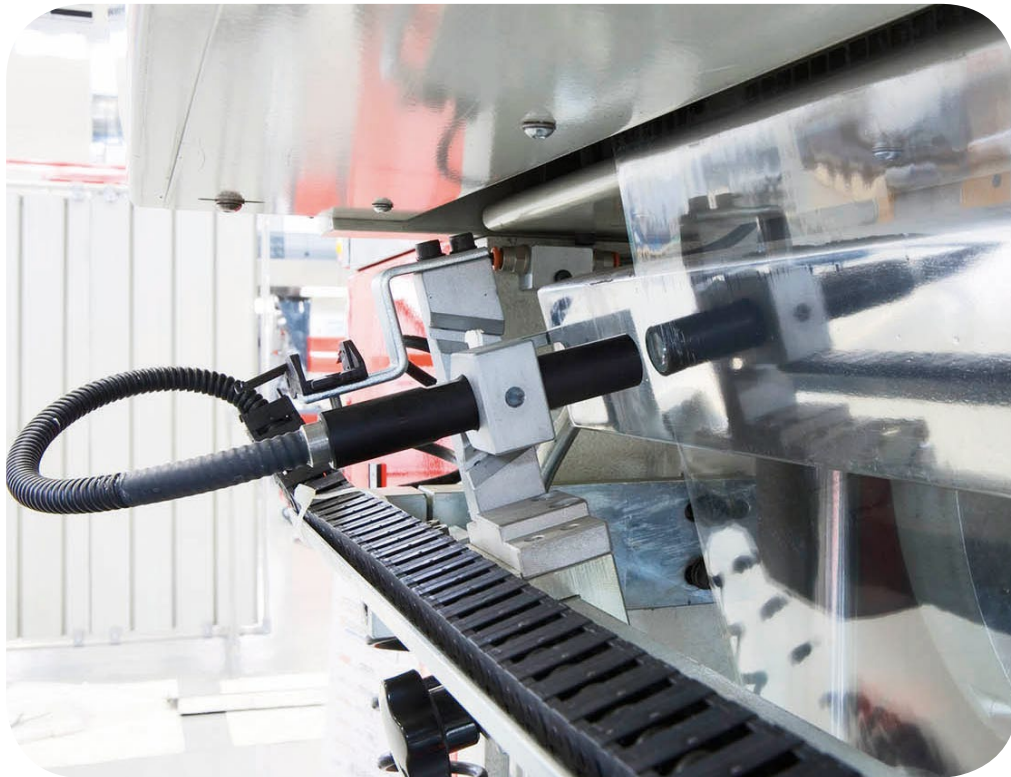

DENSITY
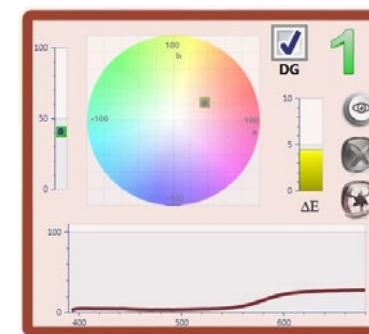
L*A*B* GRAPH

L*A*B* VALUES

MAIN OPERATOR SCREEN

HISTOGRAM TRENDS

> COLOR REGISTER CONTROL SYSTEM FOR PACKAGING ROTOGRAVURE PRESSES

> SYSTEM FUNCTIONS

GAUSSIAN GRAPHS OF REGISTER ACCURACY

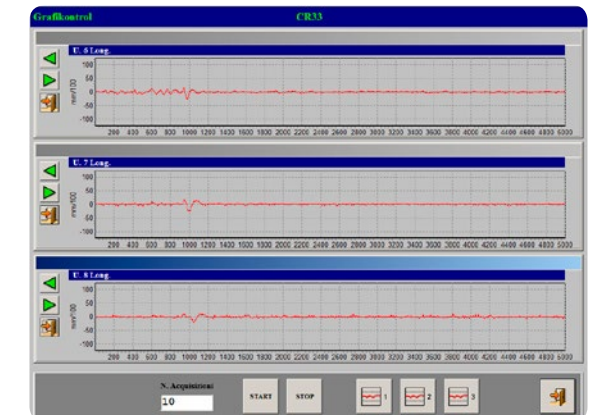REGISTER TREND

SET UP SCREEN

MAIN OPERATOR SCREEN

The CR33 - CR34 register control systems guarantee the highest accuracy and reduction of waste during all phases of production: make-readies, acceleration, and splices for both mechanical and e-shaft presses. The superior electronic technologies and dedicated software algorithms guarantee steady register between the colors for the entire press run resulting in maximum operator and press efficiency. CR33 and CR34 can be easily adapted to different printing processes (gravure, flexo or offset). It can function on all registered printing units or as single control for a downstream station. The systems are designed to fit on new or existing presses and are adapted for in-line or tandem configuration presses. The fiber optics scanners are specially designed using high sensitivity RGB sensors which automatically adapt the amplification to detect very low contrast colors on any kind of substrate.
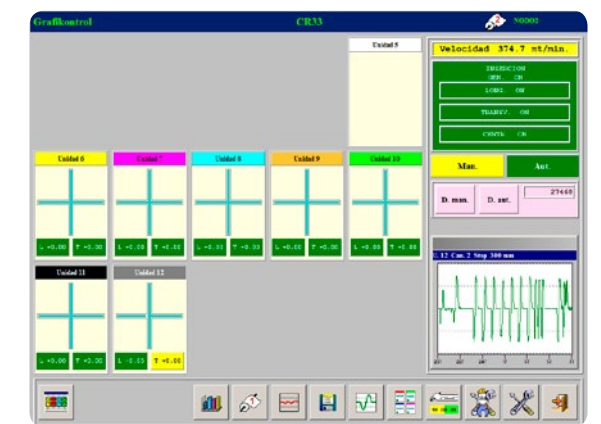
• The hardware design allows the system to be adapted to the customer requirements:
  - The CR33 comes with a cabinet to hold all the required electronic components in one enclosure
  - The CR34 is supplied as an integrated unit for new e-shaft presses
• The motorized scanners (designed for ex-proof areas) along with the "automatic-pattern-recognition", "mark-auto-search" and "mark-auto-centering" allow a fully automatic start-up without any operator intervention (with an initial scanner position tolerance of ± 7 mm).
• The LED light source guarantees more than 100.000 hours of life (11 years). The 1 mm light spot allows mark size to be reduced to 3 by 3 mm.
• Various mark patterns and shapes can be programmed or selected from the library so that existing cylinders can be used.
• The "auto-preset" function, developed for electrical shaft presses, performs the cylinder phase presetting and guarantees completely automatic register start-ups.
• Real time charts display the error trend and the production statistics. The system also provides an interface to the company network or external users for data sharing.

• The user-friendly touch-screen interface utilizes intuitive graphics and gestures to assure easy learning, fast set-ups and simple adjustments during the job run.
• Make-readies will be quicker with the job storage database, all the job parameter settings, such as press configuration, compensator preset, register tolerance can be saved and recalled.
• Specially designed software allows the system to control the insetting of pre-printed webs or for registration with downstream processes.
• When the register error exceeds the set threshold value, a visual and audible alarm is activated and a waste output signal is provided to mark or reject the product.
• The system provides various data output possibilities for diagnostics or reporting such as: real time register trend streaming, out of tolerance trigger signaling, or spooling to an external printer port.
• The system is configured for remote support through a dedicated and secure VPN connection.

grafiKontrol
INSPIRED BY TECHNOLOGY
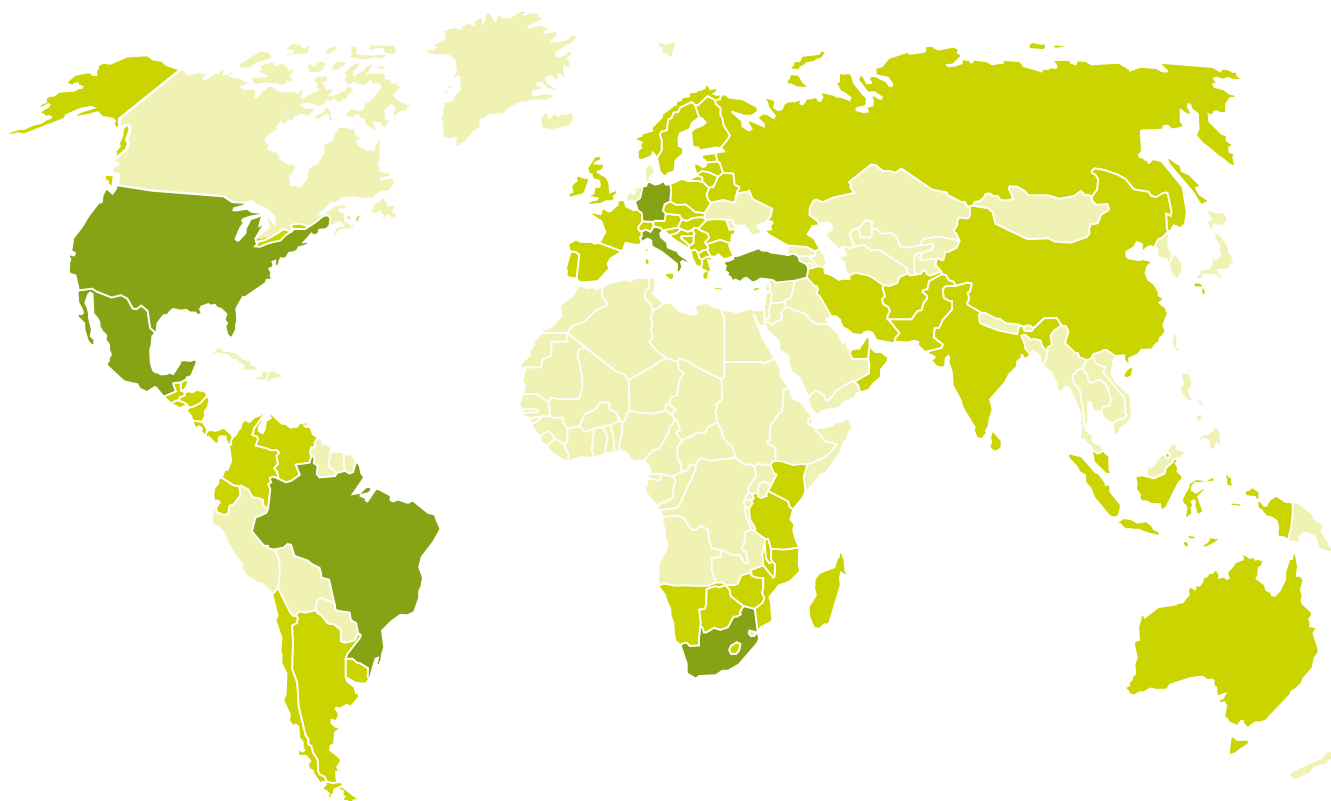
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