

porqué

# Why Instrument Flight<sup>®</sup>?

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почему

pourquoi

Tech<sup>®</sup>



## System Brunner

INSTRUMENT FLIGHT<sup>®</sup> is a comprehensive quality assurance solution from System Brunner that increases mastery of all aspects of the printing process and offers high cost savings potential. Color control with the priority on color/gray balance leads to optimal color consistency with a high level of automation. Instrument Flight safeguards the print results in accordance with international standardization concepts (Globalstandard<sup>®</sup>, ISO/PSO, G7<sup>®</sup>) and rates print quality with the future-oriented System Brunner 5-Star quality rating system. Moreover, the system permits extensive print process diagnosis in real time that enables problems with the process or materials to be recognized and resolved at an early stage.

# SIX ADVANTAGES THAT MAKE INSTRUMENT FLIGHT® UNIQUE

The color variations shown here are typical for print jobs, even when the solid tone areas and L\*a\*b\* values are kept constant. The reference image is in the center. The six images grouped around it show color casts (changes to the color balance and gray balance) that are caused by the usual process influences in printing, and lead to tone value increase deviations in the mid tones of  $\pm 4\%$  and in the mid tone gray balance of  $\Delta E 6$ . Such color variations in printing are detected by Instrument Flight and automatically corrected.



## The limits of conventional density control

When using conventional density measuring and control systems, one assumes that once the print process is calibrated, it will deliver print results of uniform color over a long period and only the solids in the individual colors need to be controlled.

In practice however, printers notice that they must adapt the target densities during the run and from job to job due to their visual perception in order to achieve reliable color consistency in illustration printing. In other words: they use the measuring system to make visual adaptations based on their color perception when comparing the OK sheet/proof/softproof with the actual print.

## Causes of visible color variations in printing

Despite the same solid densities and L\*a\*b\* values, disturbing color variations can appear in the image during the run. These are caused by the numerous influencing variables in the printing process such as ink, substrate, blanket, fountain solution composition and amount, ink/fountain solution balance, press settings, etc. These parameters lead to color variations in the image because TVI (tonal value increase), Gray Balance, three-color overprint behavior of the inks, trapping, relation of the solids to the TVI, L\*a\*b\* deviations of the inks, etc. are continually changing.

INSTRUMENT FLIGHT® controls and regulates these technical parameters in a picture-related manner which provides following advantages.

## 1 Optimal color consistency

Whereas conventional density measuring and control systems only regulate the individual solid tone areas, INSTRUMENT FLIGHT® records and controls over 30 measured printing parameters that influence the color of the picture. More than 80% of a picture is made up of screen dots in different tonal value steps – single-color, two-color, three-color and black. With solid ink density control, these areas are not taken into account. In other words: with INSTRUMENT FLIGHT® one gets more consistent color and a higher level of automation without frequent manual intervention.

## 2 Better harmony between human color perception and control software

INSTRUMENT FLIGHT® controls the print result in the way that the pressman perceives color differences in the picture. INSTRUMENT FLIGHT® is based on the System Brunner picture analysis which examines human color perception with different process variations in printing.

Therefore INSTRUMENT FLIGHT® does not simply control every BCY color independently of the others and not only in the solids, but is operating with a multidimensional control strategy, providing a relationship between the different colors in accordance with human color perception. INSTRUMENT FLIGHT® keeps the entire picture in “balance” and controls the appearance of the printed image. Balance Navigator® is the unique tool for predictable and easy color adjustments (figure 4). With the new “Color Balance Control Priorities™” an even more precise match of the individual picture content is achieved (figure 1).

## 3 The most comprehensive Industry Standards

A printing standard defines a set of technical parameters with target values and tolerances for a certain printing process. These parameters influence the color of the print result. As a pioneer, System Brunner has played a major role in standardization in the printing industry and has today with Globalstandard® the most comprehensive definition of Industry standard. Many findings and definitions were adopted in the concepts of ISO/PSO and G7®. That's why the parameters of Globalstandard® System Brunner conform with, and go beyond, today's standards

because this system includes important parameters that have a decisive influence on the print result. As a result, the System Brunner Globalstandard® definitions are the Masterset that include the ISO/PSO and G7® definitions and go even beyond (figure 2). This means: enhanced color predictability and the flexibility to cover different market needs.

## 4 Quality rating with the System Brunner 5-Star Score★★★★★®

Even the best printers cannot cope when they must decide at the press within seconds whether the print result is perfect or unsatisfactory relative to the printing standard. With the 5-Star quality rating system, one can see at a glance with every measurement and in every inking zone how well the actual result conforms with the printing standard selected or the OK sheet. This rapid evaluation saves time and provides quality assurance.

## 5 The most comprehensive printing process diagnosis

With every measurement, the print professional gets immediate and detailed information from the printing process diagnosis and at a glance can evaluate the color balances, the tonal value increases, solid ink densities together with the overprint behavior of the CMY colors, and also see the relation to the L\*a\*b\* values (figure 3). In this way, the pressman or supervisor observes momentary changes in the materials such as ink, paper, and fountain solution, and can also quickly establish whether press settings might be the reason for varying results. Thus optimal material combinations are developed and permanently monitored. Communication with the suppliers becomes more objective, and problems are recognized and resolved faster. This saves time and reduces costs.

## 6 Permanent training tool, optimized communication between the prepress and printing operations

Color control with the priority on Color Balance, quality rating and print process diagnosis including L\*a\*b\* analysis form objective guidelines to keep the staff permanently informed. This makes communication between prepress and the pressroom more objective and purposeful. They work with each other instead of against each other which is often the case. This saves a lot of time and effort.

# INSTRUMENT FLIGHT® NEW COLOR BALANCE CONTROL PRIORITIES™

figure



## Gray/Color Balance Priority

Picture related Control Priority for reproductions with common UCR/GCR

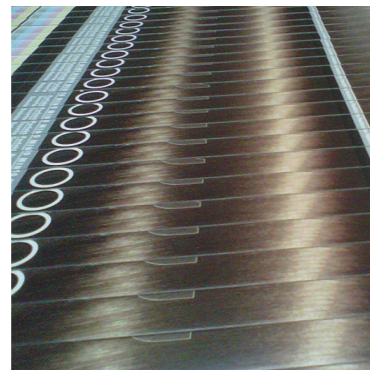
Keeps Gray Balance, Overprints and Single Colors, Mid Tone TVI and Solid Tones in Balance



## G7® Gray Balance focus

Control Priority with reference to Gray Balance Calibration G7, giving priority to Gray Balance for production control

Gives a strong priority on Gray Balance/ Overprints in Mid Tones and shadows, minor part on Single Color TVI/Solids



## Solid Balance

Control Priority for 4-C reproductions with strong impact on Solid Tones, keeping the Solid areas balanced

Gives a strong focus on the Single Color Balance in the Solids, only to a minimal degree on Mid Tones and Gray Balance



## ISO/PSO

Control Priority for 4-C reproductions with major impact on Single Colors and 2-C overprints

Keeps Solid Tones in Single Colors combined with Mid Tone TVI and spread of TVI in Balance, without Gray Balance. Note: Gray Balance is not specified in the ISO Norm



1) The "Color Balance Control Priorities™" makes color control even more picture-relevant



## Gray Stabilization (GCR)

Control Priority for reproductions with strong Black and reduced CMY colors

Gives more priority to Single Color Balance than to Gray Balance / Overprints



figure 2) Globalstandard® is the Masterset of a Printing Standard and combines the ISO/PSO and G7 Parameters

## GLOBALSTANDARD®, ISO/PSO, G7®

### Globalstandard® System Brunner

- Solid Ink Density (SID) individual colors, representing the L\*a\*b\* reference (with Best Match method)
- Gray Balance in Mid Tones/3-C Solid Tones
- Tone value increase (TVI) BCMY 50% (production control); complete Curve for process diagnostics and calibration
- Overprint TVI and SID in Mid Tones/Solid Tones
- Spread single color TVI in CMY <= 5%
- Tone Value Increase (TVI) in tolerance ± 4%
- Conformities between CMY TVI and SID
- L\*a\*b\* in Solids according to Profile reference
- L\*a\*b\* Gray Balance Mid Tone
- L\*a\*b\* of substrate

### ISO/PSO

- Solid Ink Density (SID) individual colors, representing the L\*a\*b\* reference
- L\*a\*b\* in Solids according to Profile reference
- Tone value increase single colors BCMY 40/50%
- Spread single color TVI in CMY <= 5%
- Tone value increase in tolerance ± 4%

### G7® Process Calibration method

- L\*a\*b\* in Solids according to Profile reference
- Solid Ink Density (SID), representing the L\*a\*b\* reference
- L\*a\*b\* Gray balance Mid Tone

## QuadTech Color Control System with INSTRUMENT FLIGHT® Important features and functions

Software for inline inking unit regulation on heatset web presses with Instrument Flight technology

Complete integration in the QuadTech Color Control System with SpectralCam™

Applications: color control, production standardization, quality rating, diagnosis, analysis and optimization of the printing process

Regulation strategy with the priority on color/gray balance taking > 30 printing parameters and the L\*a\*b\* measured values 1) into account

Automatic "L\*a\*b\* Best Match" optimization of the solid tone target values during production within the scope of Instrument Flight regulation strategy

5 Balance Control Priorities™ for optimal consideration of different standards, types of pictures or types of reproductions

8 Globalstandard® definitions for different types of paper incl. tone value increases, solid ink densities, gray balances, L\*a\*b\* 1)

User-defined standards can be set for specific printing conditions or printing process calibrations (e.g. G7®)

Balance Navigator® for reliable color balance or contrast corrections in a closed loop

Separate OK-sheet definition for Top/Bottom and production color control according to the grey balance, tone value Increase (TVI) and solids measured in each ink zone

Quality rating to a defined printing standard with System Brunner 5-Star Score ☆☆☆☆☆★☆☆☆☆®

Hexagon diagram for graphical measured value presentation and process diagnosis of all printing parameters at a glance for every inking zone

Display of recommended balance-prioritized ink adjustments for each ink key in every printing unit

1) Instrument Flight + L\*a\*b\* optional

The QuadTech SpectralCam™ delivers spectral data for precise, cost-effective color control and color management.

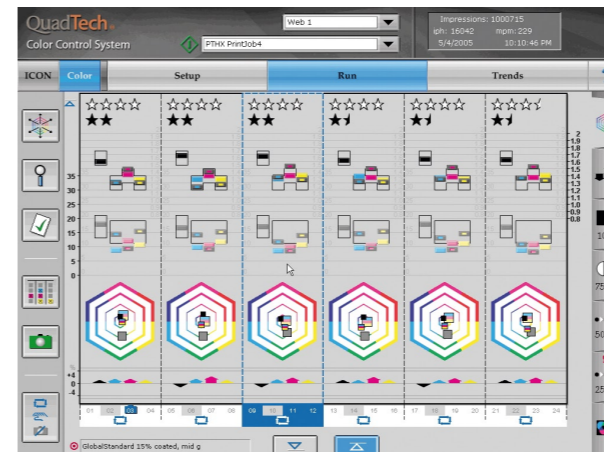
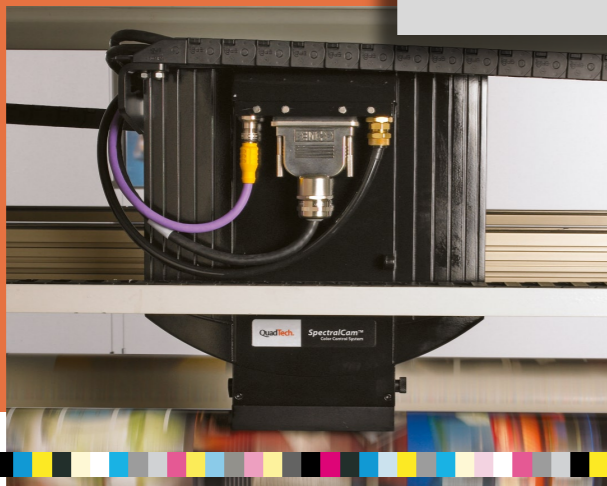


figure 3) Hexagon diagram with 5-Star quality rating and process diagnosis

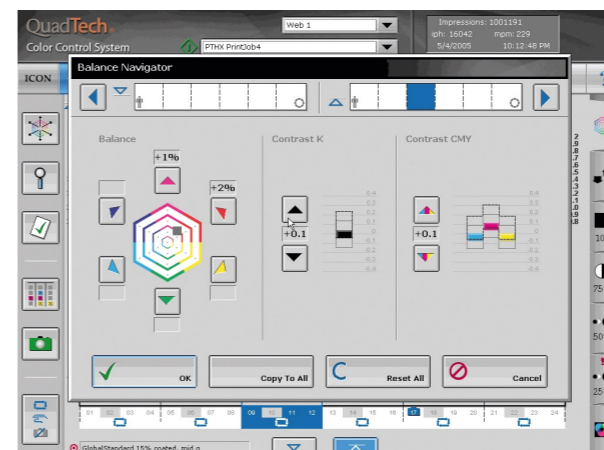


figure 4) Balance Navigator® for predictable and easy color adjustments

## About QuadTech

QuadTech, Inc. is the world's leading innovator of advanced color and inspection technology for the printing industry. Founded in 1979, QuadTech sells its automated auxiliary control systems in more than 100 countries to the web offset newspaper and commercial markets, packaging and converting markets, and publication gravure market. Headquartered in Sussex, WI, USA, QuadTech maintains a worldwide network of sales and service operations, and is proud to be registered ISO 9001:2008 DNV. QuadTech is a subsidiary of Quad/Graphics, one of the largest and most technologically advanced printers and multi-channel solutions providers in the world.

The QuadTech Color Control System with INSTRUMENT FLIGHT® and SpectralCam™ measures the remission data of up to 11 patches in a single image capture. The sensors detect and analyze printed micro color bars at full press speed. Then Instrument Flight software calculates extensive process information and controls the printing process in every inking zone with over 30 parameters including the gray balances, solid ink densities, dot gains, L\*a\*b\* values and more throughout the production run. Operators get a real time view of performance indicators.

The Color Control System with INSTRUMENT FLIGHT® and SpectralCam™ is based on the proven System Brunner color/gray balance control strategy that has been continually refined and with its indirect image control provides the highest level of color consistency. It also ensures flexibility and compliance with international standards and methods like Globalstandard®, ISO/PSO, G7®, etc. The heart of the application is innovative and sophisticated software that is the result of more than thirty years of practical experience. Instrument Flight is an important module of the QuadTech Color Control System. The partnership between QuadTech and System Brunner started in 1999 and this has provided the foundation for development and implementation of the most technically advanced and innovative color control systems on the market today for web offset printing.



# System Brunner



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

## About System Brunner

System Brunner AG, global leader in process control, color control, quality assurance and standardization, develops and markets systems for the graphic arts industry and has been defining industry standards for printing processes from pre-press to print for more than 30 years. System Brunner's competence is founded on an in-depth knowledge of printing processes and highly sophisticated measuring, interpreting and evaluating methods. System Brunner cooperation partners are: QuadTech, KBA, Digital Information, manroland sheetfed.

Further details on [www.systembrunner.com](http://www.systembrunner.com)

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