

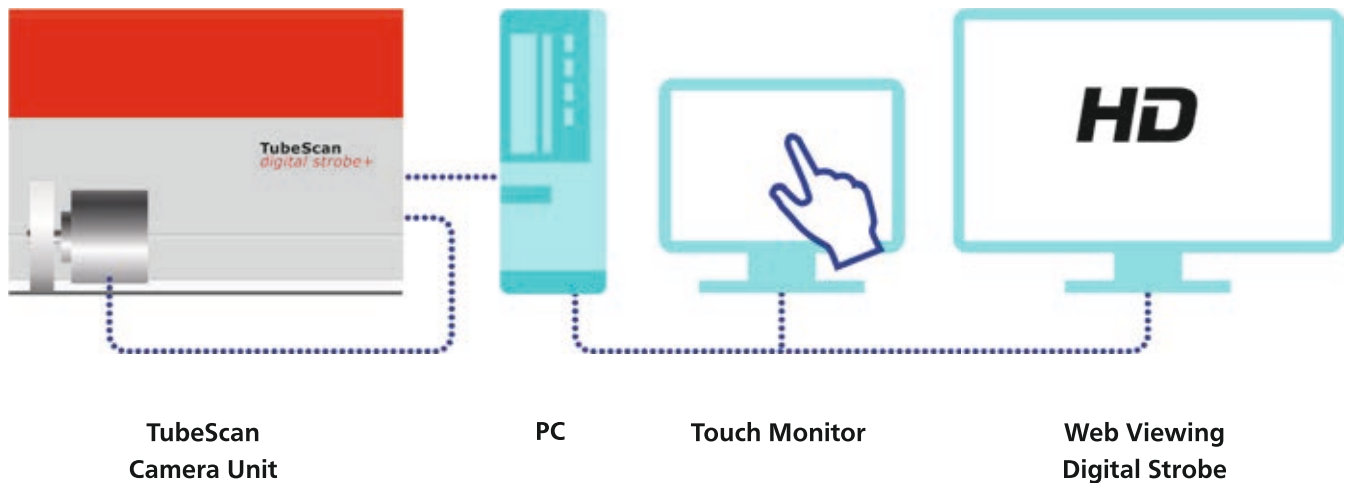
The TubeScan



Print inspection reinvented
modular • intelligent • cost-efficient

TubeScan *digital strobe*

// System Overview



// The intelligent solution for print inspection

Quality control during printing or finishing has to be simple and must be very reliable. At the end, your reputation depends on the work you deliver to your customers.

Conventional methods such as counting of repeats, detection of missing labels with photoelectric sensors or the visualization of moving webs with strobe lights often reach limitations and are complicated to use. On the other hand, automatic print inspection systems based on line scan cameras might be oversized and too expensive for many applications.

Hence, the concept of TubeScan sets a new standard with the smart combination of imaging technology and the stroboscopic principle.

TubeScan provides considerably higher process reliability with the base function digital strobe because it always delivers a steady image and true colour representation – independent from the machine speed. Thus, the operator keeps full control over the entire production, even during critical phases like make-ready time or start/stop.

The function digital strobe+ is not only accurately counting repeats, labels and missing labels in total and per lane, but it also detects matrix residues across the entire web width. This eliminates the usage of expensive and unreliable sensors and the necessity of cumbersome and time-consuming sensor adjustment.

By choosing the additional option digital strobe++ TubeScan even becomes a full grown print inspection system, which is able to detect print defects and register variations below one millimeter. So you live up to your reputation in an economic way by delivering quality up to your customer's expectation!

TubeScan *digital strobe*

// Intelligent print inspection

Introducing 100% print inspection that has never been as simple and cost-efficient as offered by the TubeScan. From simple 100% web monitoring, detection of missing labels and matrix residues to high resolution 100% print inspection within a workflow – now you are able to realize all your needs with one modular system.

Performance characteristics:

- Can take & display up to 30 images per second in live mode– seamless monitoring of every repeat in real time
- Maximum speed range: 150 m / min – 600 m / min
- Maximum web width: 180 mm – 1100 mm (7" – 44") – depending on the model

Digital Strobe for print inspection

TubeScan *digital strobe+*

Counting and Completeness

100% print inspection to detect missing labels, matrix residues and coarse defects larger than approx. 5 mm

Your benefits:

- No time-consuming sensor adjustments
- Detection of missing labels, coarse print defects and matrix residues (defect size Ø approx. 5 mm)
- Accurate counting of repeats, labels and missing labels for up to 20 lanes
- Generation of a 24 volt defect signal to trigger an alarm or marking system
- Optional placement control module with defect queue for automatic control of a rewinder



Display on
Touch-screen HMI



Real time display
of the full repeat
on HD Monitor

TubeScan *digital strobe++*

100% high-resolution print inspection

To detect fine print defects, splashes, register and color deviations, etc.

Your benefits – in addition to **digital strobe+**:

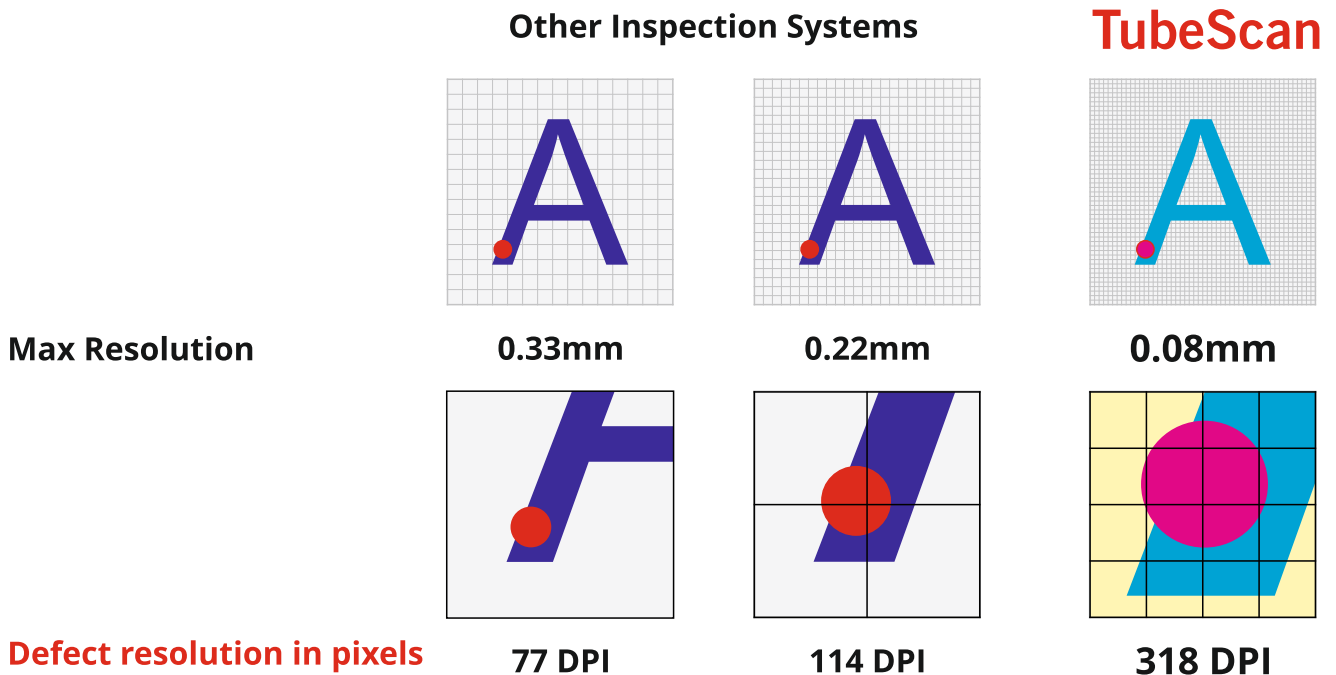
- Detection of fine print defects, register defects and large color variations
- Secondary inspection zones allow defining specific areas at higher or lower inspection tolerances
- Automatic label contour detection
- Masking function to ignore defined areas
- Surface inspection
- Job save function for repeat orders
- Real-time display of detected defects on HD monitor

TubeScan *digital strobe*

// Introducing **NEW 4K Camera**

The TubeScan is now equipped with an all NEW 4K resolution Camera for a finer and a higher level of inspection in a more precise way compared to other inspection systems available in market. The following illustration will help you to explain the minimum size of defect detected by TubeScan with an all NEW 4K camera.

Defect within letter "A" font size 10 (Arial) on your web



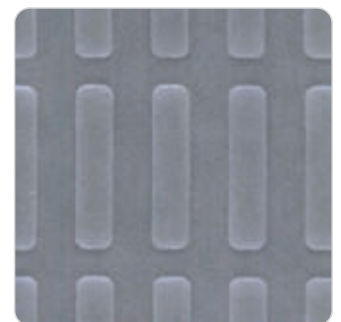
// Salient Features

Standard features of all models:

- 100% web viewing during make-ready and production and Superb image quality due to high camera resolution
- Automatic repeat synchronization across the entire speed range of the machine
- No health risk, less tiring compared to conventional monitoring using strobe lights
- Fast and easy job setup, Very reliable and stable operation, Cost-efficient

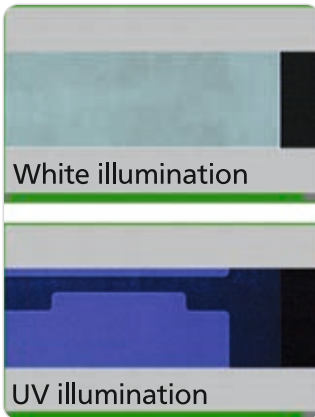
Transparent labels on transparent or opaque liners:

- Use the special contour light to create an image contrast when producing transparent labels on clear or even white paper liners
- Detect almost invisible missing labels and matrix residues, especially on blank labels
- Switch between standard white light inspection and contour light inspection
- ✓ Clear-on-clear
- ✓ Clear-on-paper
- ✓ Sleeves / tubes



TubeScan *digital strobe*

// Salient Features



UV inspection for luminescent applications:

- Switch between standard white-light inspection and UV inspection
- Inspect luminescent areas such as coatings, adhesives, silicones
- Inspect features printed with UV & fluorescent inks
- ✓ Security Prints

Pinhole detection:

- Detect tiniest pinholes in aluminum foil and other opaque webs
- Switch between direct white light illumination for standard print inspection and back light illumination for pinhole detection
- ✓ Aluminum lids
- ✓ Blister packs



Distance Monitoring Module*

- Distance monitoring with alarm and external OUTPUT
- Horizontal and vertical measuring possible
- Repeat length measurement when selecting one anchor point
- Easy to set-up
- Measurement based on icon or horizontal/vertical edge
- New satellite function (one common reference for multiple measurements)
- Obtained results are stored (can be exported and integrated in the report)



TubeScan *digital strobe*

// Salient Features

Delta-E Monitoring*

- Delta E comparison against color-monitoring zone defined in the master
- Multiple zones possible
- Zone size can be adjusted

Delta-E Inspection Results

ID	ΔE
01	1.4



PDF Tool Box

- PDF Validation of Golden Image
- Import of MASKING· DIE-CUTTING contour
- Import of inspection zone definitions



Inspection of highly reflective materials:

- Use the adjustable backing bar (with optional idler rolls) for bright-field or dark-field inspection
- ✓ Cold foil / hot foil applications
- ✓ Holograms
- ✓ Coatings

Smart Barcode verification*

- Decoding and grading of static and variable bar-codes in real-time
- Currently supported (see list in image)
- Available upon request (GS1 Databar1, Industrial 2 of 5, Interleaved 2 of 5, Pharmacode, Planet, Postnet, Aztec, Dotted Data Matrix, Maxicode, Micro QR, PDF417, MicroPDF417, Truncated PDF417, Composite, SEMI)

All number recognition applications require sample test by Nyquist!



Alphanumeric sequence recognition*

- Recognition of static & variable numbers in real-time
- Full alphanumeric recognition in preparation (on request)
- Teach mode
- GS1 Databar1 / Industrial 2 of 5 (standard 2 of 5) / Interleaved 2 of 5 (ITF-14) / Pharmacode / Planet / Postnet

All number recognition applications require sample test by Nyquist!

TubeScan *digital strobe*

// Backing Bar

Adjustable backing bar for liner-based materials



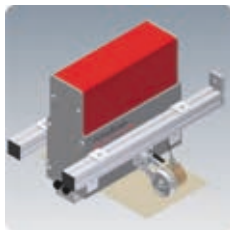
Adjustable roller backing bar for sensitive materials without liners



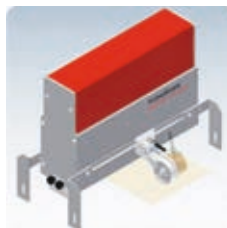
Back light illumination: The backing bar can be equipped with integrated back light illumination for: Pinhole detection, Buried antennae structures in RFIDs, Equalization of textured surfaces such as Tyvek®, Monitoring of the back print register

// Mounting

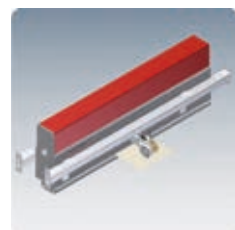
Cantilever mount, for housings up to 510 mm of length

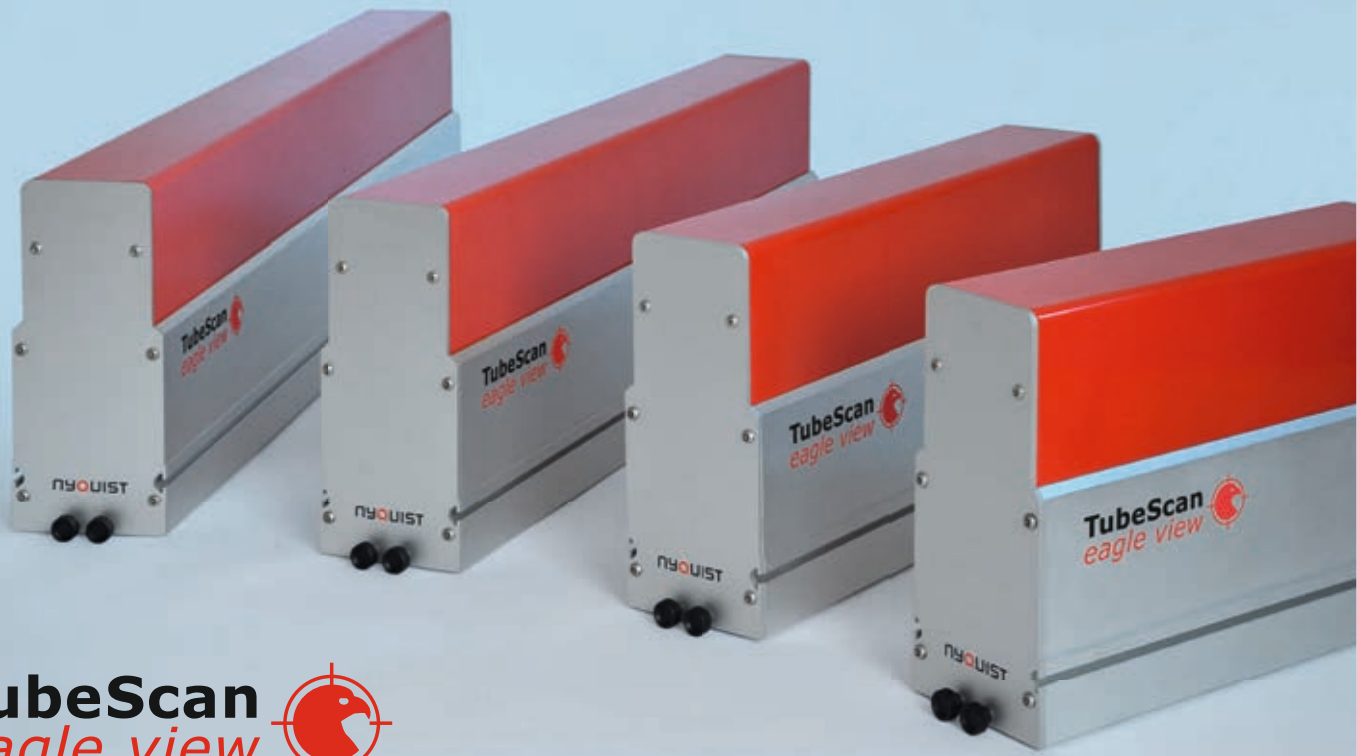


Front mounting brackets



Customized double-sided mounting





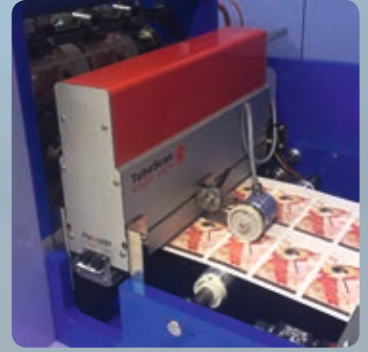
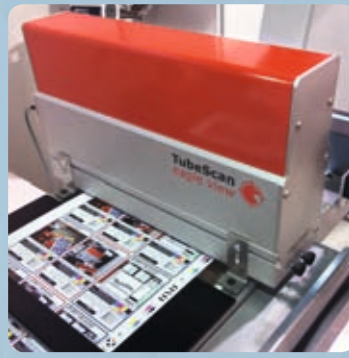
// The economic solution for the printing press

Web viewing systems are a standard in the converting and label industry. They are used on almost every printing press for monitoring registration, overall print quality and accuracy, and color. The down side of in-line 100 % inspection systems so far has been the heavy investment, which many printers have avoided, thereby compromising quality assurance.

The new patented **TubeScan eagle view** is now bringing both worlds together: Multiple cameras are combined in the same housing to offer detailed viewing and 100 % inspection at the same time. The intuitive touch screen interface makes setup extremely simple and fast.

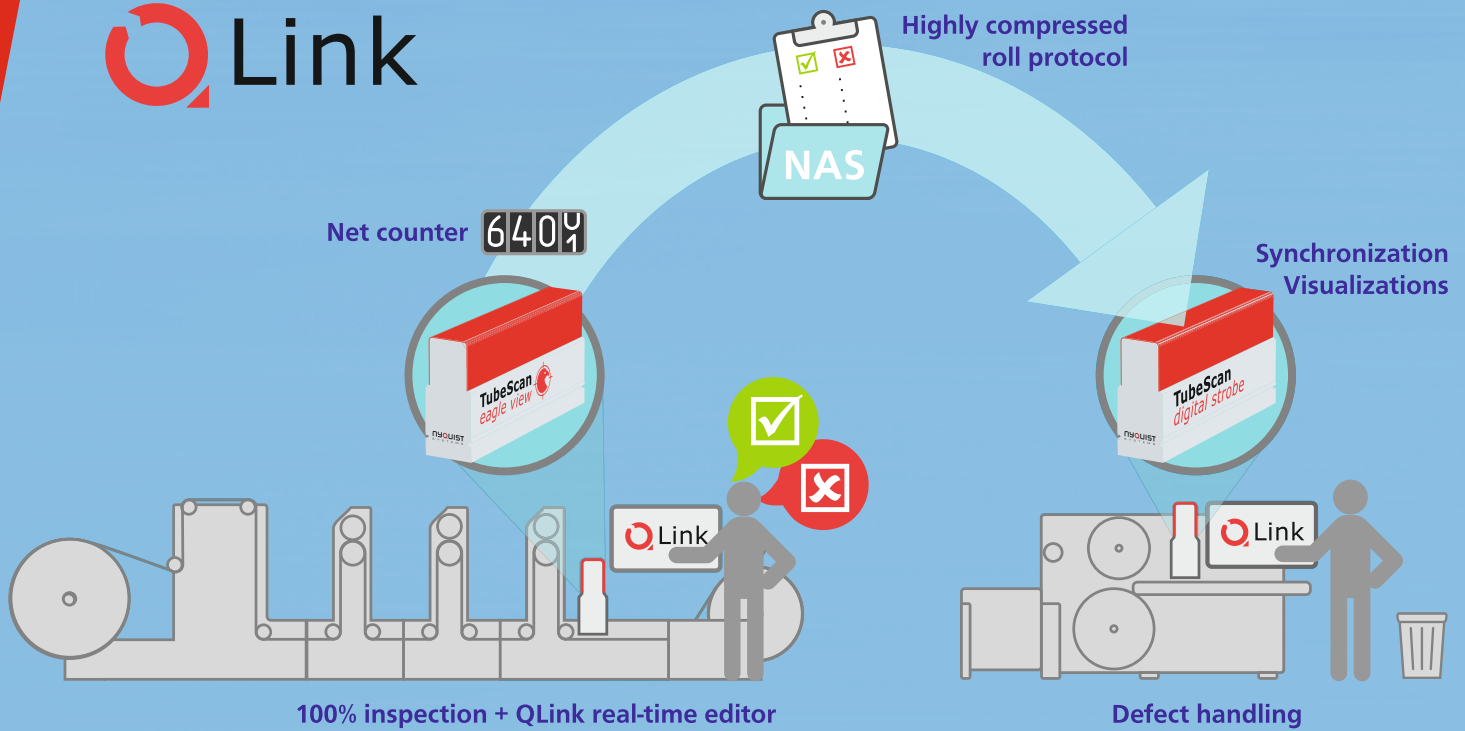


Full web view and detail viewing
down to dot matrix level



Your benefits:

- Cost-efficient combination of 100 % print inspection and detail viewing
- Detail viewing of critical areas like registration marks, 2D barcodes, picture areas, etc. down to dot level
- Camera for detail viewing is motorized and can be easily navigated with respect to the displayed print repeat
- Switchable UV illumination (365 nm)
- No print mark sensor or gear sensor required for synchronization
- The optional back light enables monitoring of the back print register
- Small foot print, only requires 125 mm (5") in web direction
- Can be combined with all options available for **TubeScan digital strobe** such as fine print inspection, PDF reporting, dynamic roll map, etc.



// Inspection workflow – smart and economic

QLink *Press*

on the printing press

✓ A Software module with local mass storage (NAS), based on **TubeScan digital strobe** or **TubeScan eagle view**

Real-time editor

- Editing of the roll protocol database during printing
- Display of the net count in real-time, taking into account the edited roll protocol of the entire job

Roll management

- Selection, editing and transfer of the roll protocols within the network

Local mass storage (NAS)

- Temporary, local data storage of the roll protocols

QLink *Rewinder*

on the rewinder

✓ A Software module, based on **TubeScan digital strobe** or **TubeScan eagle view**

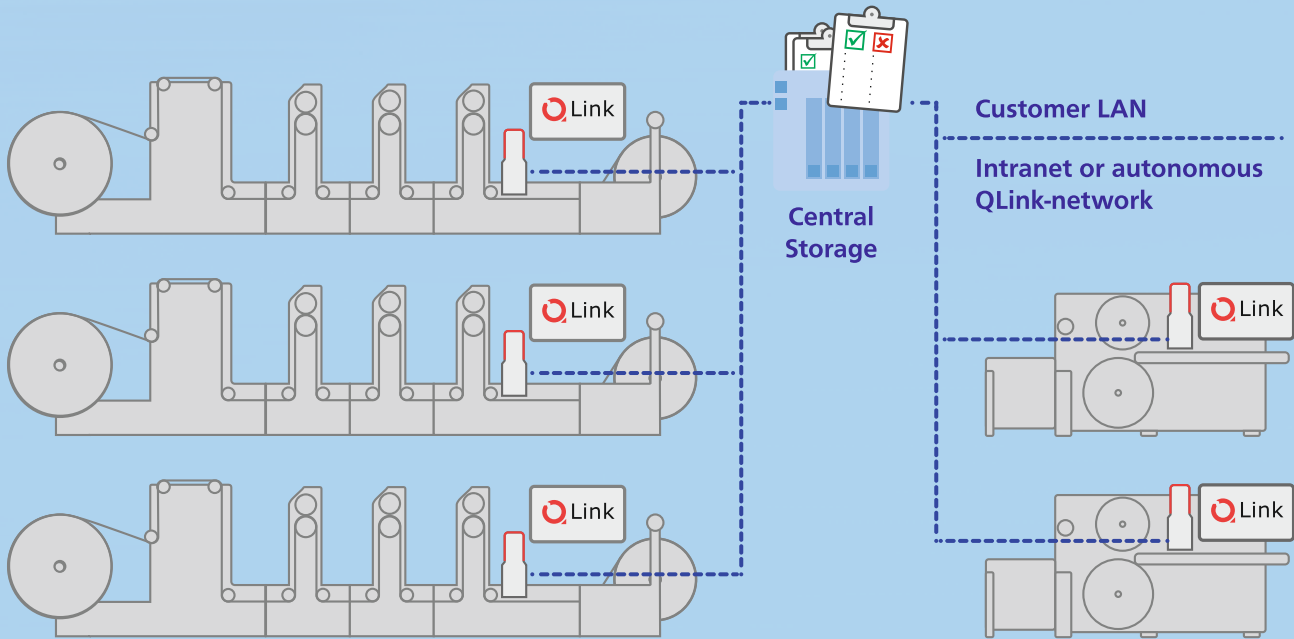
- Processing of all roll protocols in the network
- Camera-based synchronization and visualization ensures best workflow stability
- Control of the rewinder
- Skipping of future defects shown in the roll protocol

If there is no roll protocol from the printing press, you can use the TubeScan on the rewinder for missing label detection or even 100% print inspection—depending on your license package.

The TubeScan on the rewinder substitutes tiring strobe lights, commonly used for web monitoring.

Network

Connection of the modules QLink Press, QLink Rewinder, QLink Editor via LAN.



QLink *Editor*

on the PC

- ✓ The software module QLink-Editor is installed on a separate PC (Windows 10). It can either be included in the order or supplied by the customer.
- Processing of all roll protocols in the network
- Roll protocols can be visualized and edited for further converting

Your Benefits:

- In comparison to previous inspection workflow systems, the cost for QLink workflow is significantly lower.

... on the printing press

- The QLink real-time editor enables you to evaluate defects already during the printing process. The printer can classify the defects as "not relevant" or "to be fixed" in the converting process.
- Larger defect areas, such as missing ink, can be defined as waste zones. These can afterwards be removed on the rewinder in one single step.
- The net count is automatically updated after each editing. No more costly over-production just to make sure there is enough good material.
- Through innovative compression, the file size of the protocols is as low as 10% of the usual roll protocols (JPEG / BMP). This saves disk space and expenses and it will speed up your data transfer.

... on the rewinder

- The camera-based synchronization is easy to set-up and very reliable – in contrast to the sensor-based systems that are commonly used.

// Technical Specifications

TubeScan *digital strobe*

Web width in mm	180	250	330	430	550	660	760	850	1100
Web width in inch	7	10	13	17	22	26	30	34	44
Digital strobe for web viewing	Yes								
Minimum Resolution	0.08 mm								
Max. web speed	600 m / min.								
Min. defect size	0.16 mm								
Touch monitor	minimum 15"								
Image rate	up to 30 images per second								
HD monitor	minimum 22" (other sizes upon request)								
Image rate	up to 30 images per second								
Maximum lateral web movement	± 10 mm								
Automatic image synchronization	Yes								
Operating temperature	0° – +35° C (+32° – +95° F)								
Supply voltage	100 V - 240 V, 50 - 60 Hz								
Shaft encoder with layon wheel	RS 422 channel A+B								
Binary outputs 24 V, 150 mA max.	Defect Found, Inspection Active, Slow Down, Final Stop								
Material / Substrate	Transparent, opaque and reflective								

TubeScan *eagle view*

(in addition to the features mentioned above)

Resolution of detail viewing	< 30 µm (motorized camera)
View area of detail camera	35 mm X 25 mm 1.4" X 1" 1600 px X 1200 px
Image rate of detail camera	< 10 images / second
Maximum speed	250 m / min (820 ft / min)
Minimum resolution	0.16 mm
Picture-in-picture navigation	Yes. Via touch monitor



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• Register Control • Viscosity Control • Density & Thickness Measurement • Process Automation