The TubeScan
Product Series

Print inspection reinvented
modular · intelligent · cost-efficient

NYQUIST
S Y S T E M S

Intelligent print inspection

Introducing 100% print inspection that has never been as simple and cost-efficient as offered by the TubeScan product series.

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 and display up to 30 images per second in live mode – seamless monitoring of every repeat in real time

▲ Maximum speed range: 150 m / min – 500 m / min (450 ft / min – 1500 ft / min) – depending on the model

▲ Maximum web width: 180 mm – 850 mm (7 " – 44 ") – depending on the model

▲ Various camera models available up to 4k resolution

▲ Optical resolution starting from 55 μm
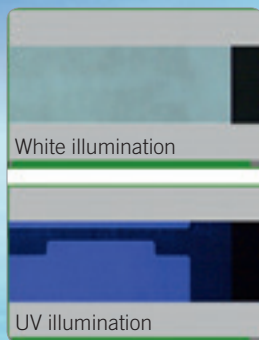
UV inspection for luminescent applications

White illumination

UV illumination

▲ Switch between standard white light inspection and UV inspection

▲ Inspect luminescent areas such as coatings, adhesives, silicones

▲ Inspect features printed with UV and fluorescent inks

→ Security print

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

Barcodes, OCR

▲ Static and dynamic inspection of 2D / 3D barcodes

▲ Static and dynamic evaluation of alphanumeric sequences (OCR)

Standard features of all models

- ◢ 100% web viewing during make-ready and production
- ◢ 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

Further options (see also page 7)

- ◢ 100% print inspection
- ◢ Secondary inspection zones for individual tolerances
- ◢ Automatic label contour detection
- ◢ Masking function to ignore definable areas
- ◢ Surface inspection
- ◢ Relative distance monitoring
- ◢ Placement control for rewinders
- ◢ Generation of PDF roll reports
- ◢ Switchable UV-illumination (wavelength 365 nm)
- ◢ Inspection workflow QLink
- ◢ Dynamic barcodes and OCR
- ◢ PDF Toolbox
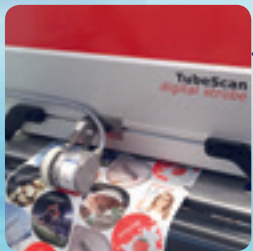
Pinhole detection

- ◢ 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 / position monitoring

- ◢ Monitor the distance between die-line and print
- ◢ Monitor the position of printed objects
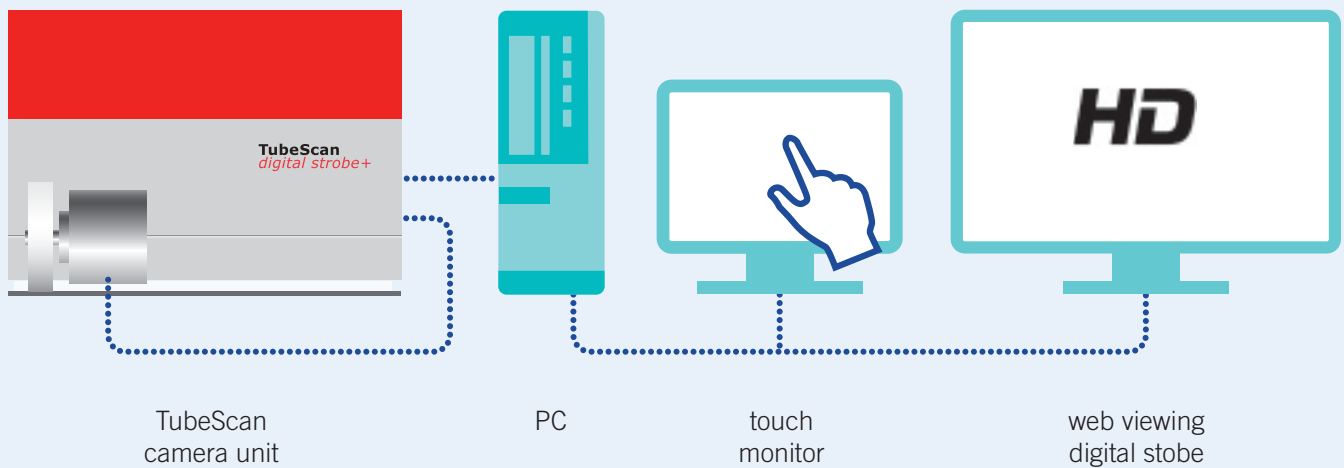 - → Die-cutting
  - → Slitting
  - → Embossing
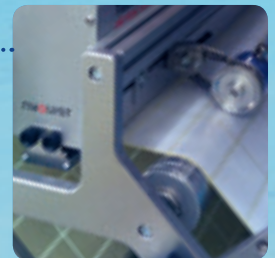
Inspection of highly reflective materials

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

System overview

TubeScan
camera unit

PC

touch
monitor

web viewing
digital stobe

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

◢ Option A using a light line with high intensity

→ Pinhole detection

→ Buried antennae structures in RFIDs

→ Equalization of textured surfaces such as Tyvek®

◢ Option B using an area light for the detail camera of the
TubeScan *eagle view*

→ Monitoring of the back print register

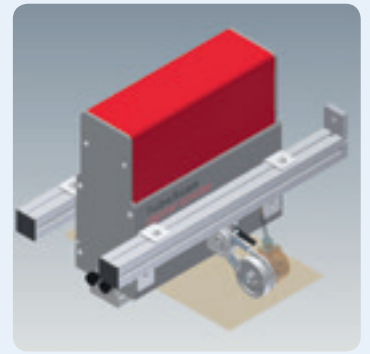→ Equalization of textured surfaces such as Tyvek®

Dimensions

290 mm
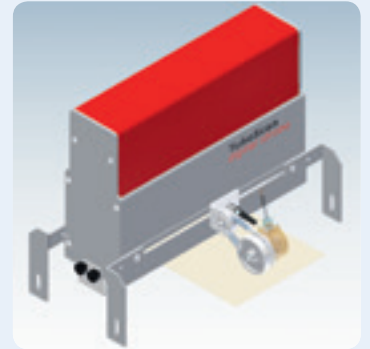(11.42")

125 mm
(4.92")
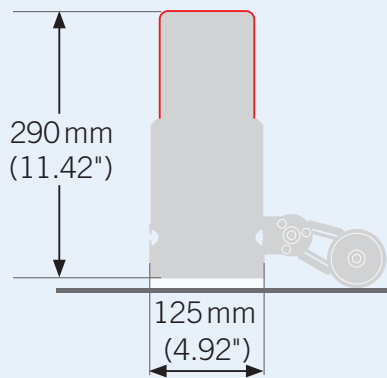
Cross section
(Width of housing depends
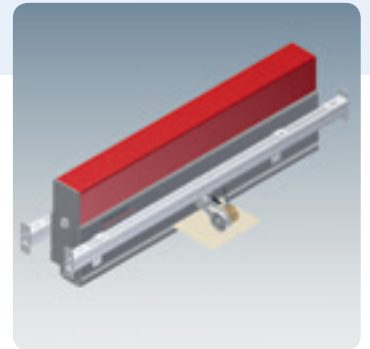on web width)

Mounting

Cantilever mount,
for housings up to
510 mm of length

Front
mounting
brackets

Customized
double-sided
mounting

Technical data for all TubeScan systems

Web width in mm	180	250	330	430	550	660	760	850
Web width in inch	7	10	13	17	22	26	30	34
Touch monitor	minimum 15"							
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	RS422 channel A+B							
10 opto-isolated outputs 24 V, 80 mA max.	DefectFound, InspectionActive, SlowDown, FinalStop, …							
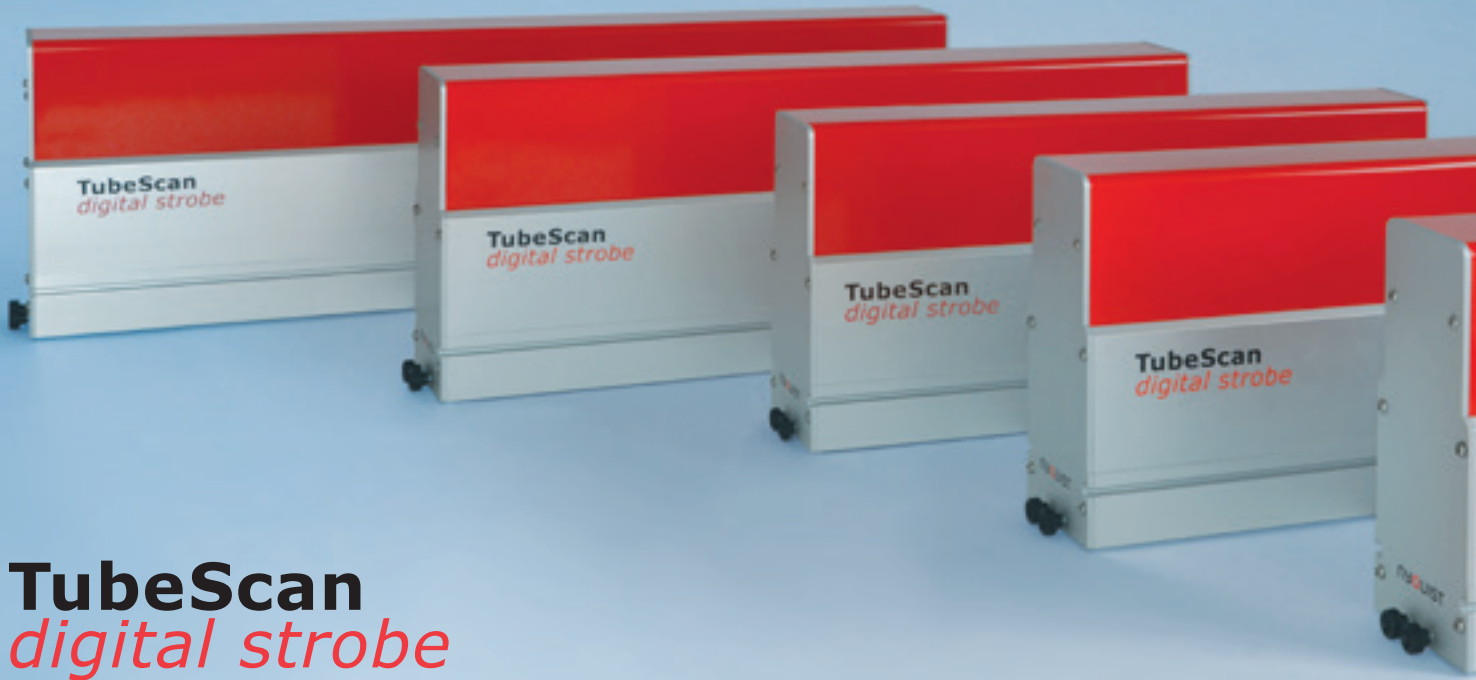
TubeScan
digital strobe

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

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 the detected defects on HD monitor
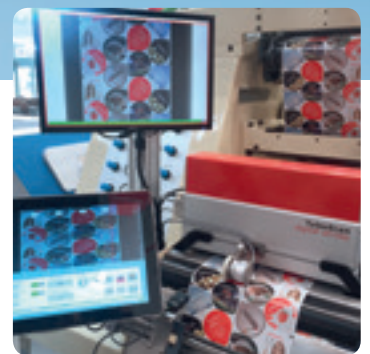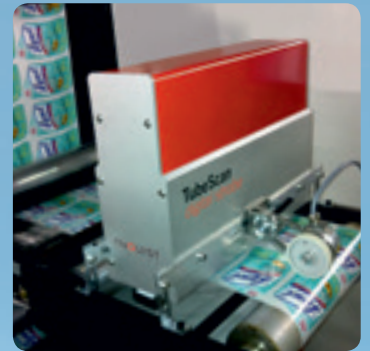
Options **TubeScan** *digital strobe++*

▲ Relative distance monitoring based on edges or shapes

▲ Generation of PDF roll reports

▲ Dynamic roll map for the visualization of all defects in the current production roll

▲ Snapshot recording at defined intervals

▲ PDF Toolbox
   a) for master image comparison
   b) import of inspection zones defined in pre-press, such as masking, die-cutting contours, secondary inspection zones, static or variable 1D / 2D barcodes and alphanumeric sequences

TubeScan models	Length of housing
digital strobe 180	310 mm (12.2")
digital strobe 250	310 mm (12.2")
digital strobe 330	410 mm (16.1")
digital strobe 430	510 mm (20.1")
digital strobe 550	610 mm (24.0")
digital strobe 660	760 mm (29.9")
digital strobe 760	840 mm (33.0")
digital strobe 850	960 mm (37.8")

TubeScan *eagle view*
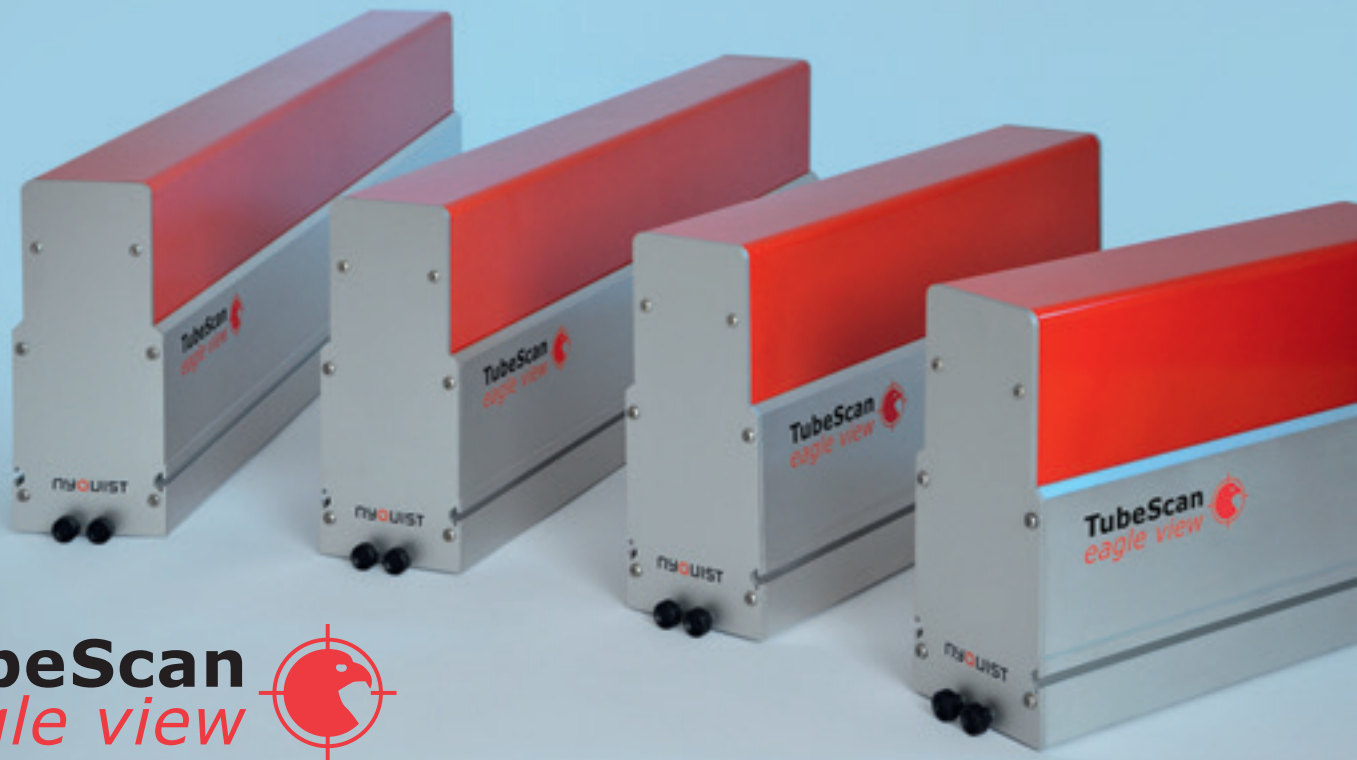
The economic solution for the printing press

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.

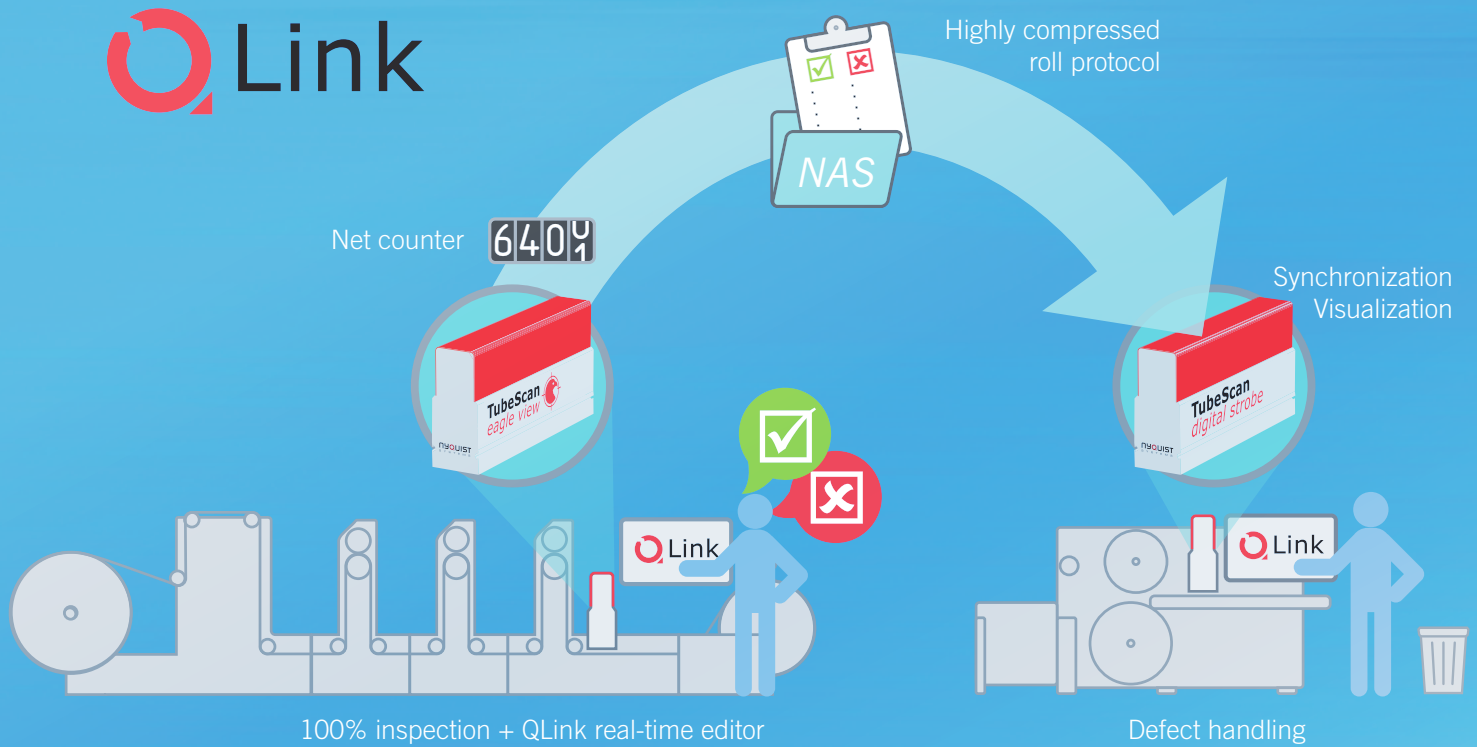Full web view and detail viewing down to dot matrix level
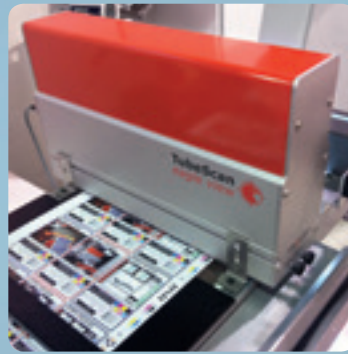
Your benefits

- ▲ 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.

Technical data

Basic features and web widths: → see pages 2 – 5

Resolution of detail viewing (motorized camera)	< 30 µm
View area of detail camera	35 mm × 25 mm (1.4" × 1") 1600 px × 1200 px
Image rate of detail camera	< 10 images / second
Maximum speed	250 m / min (820 ft / min)
Automatic image synchronization within the repeat	
Picture-in-picture navigation via touch monitor	

TubeScan models	Length of housing
eagle view 180	410 mm (16.1")
eagle view 250	410 mm (16.1")
eagle view 370	510 mm (20.1")
eagle view 470	610 mm (24.0")
eagle view 550	760 mm (29.9")
eagle view 660	840 mm (33.0")

Highly compressed roll protocol

NAS

Net counter 6404

Synchronization
Visualization

100% inspection + QLink real-time editor

Defect handling

Inspection workflow – smart and economic

QLink *Press*

on the printing press

→ 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

→ 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.

Central Storage

Customer LAN
Intranet or autonomous
QLink-network
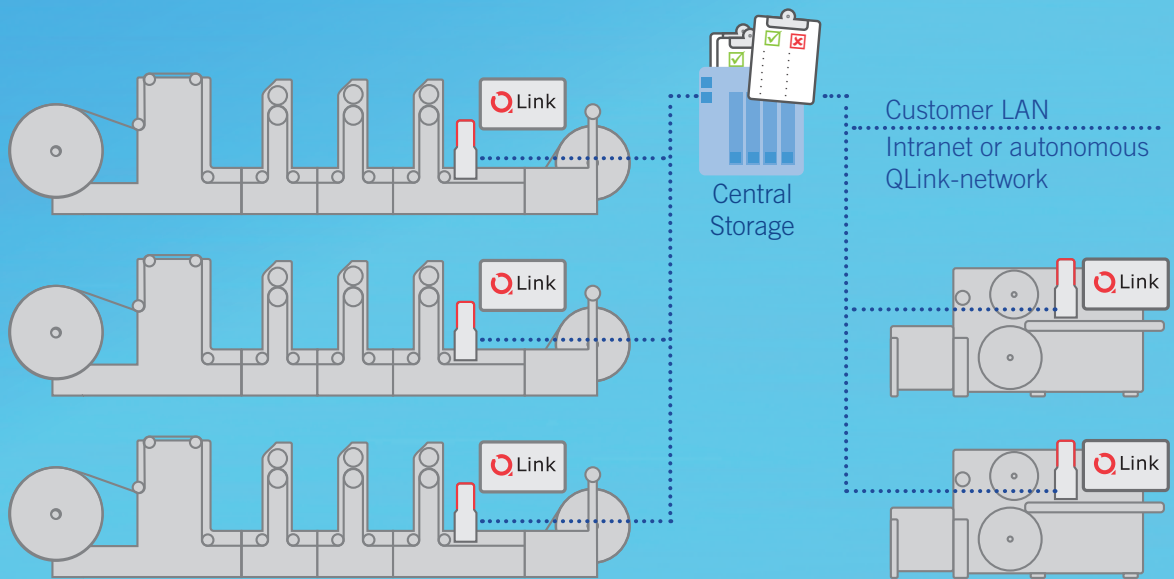
QLink *Editor*

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.

11

Technology:

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