artificial intelligence
by
WAHTARI

Quality Control

nLine Pro

Cable Inspection

360° Inline Testing Device for
Optical Inspection on Cable Surfaces

WAHTARI nLine

Areas of Application

Artificial Intelligence as the Heart of Automated Defect Recognition in the Cable Production

Surface Examination
breaks, cracks, cuts, holes, dents, pimples

Controlling Colors
monochrome, multicolored, gradient, rotating

Detecting Inclusion
foreign particles, air bubbles

Diameter Control
deviations in diameter

Check Imprints
markings, codes, lettering, serial numbers

nLine Cable Inspection Solution

Wahtari's *nLine* cable inspection solutions can analyze a wide variety of product and quality characteristics in individual inspection (test bench) or inline during ongoing production. Deviations are signaled and documented.

The systems are available in different versions and can be adapted to a wide range of requirements. The analysis & evaluation is performed on-the-edge, without connection to a cloud, for the highest performance, lowest latencies and best data security.

The commissioning does not require any technical knowledge. Product features are simply trained according to the „Teach & Go" principle by using a master sample.

Key Features

Teach & Go
few minutes to teach-in the product features by using a master sample

360° Analysis
complete detection of the cable surface

Vibration - insensitive
vibrations of the floor or the cable are no problem

Adaptable LED Lighting
adjustable to many cable types

High Performance
up to 1667m/min cable speed

Dashboard
all data at a glance

IO / Interfaces
analog & digital signaling

PROFIBUS® PROFINET® OPC UA

Technical Highlights

Low Maintenance
no tools needed / system signals when cleaning is necessary

Non-contact Measurement
no damage or influence on the product

Installation Length
max. 500mm incl. rack
max. 250mm for fixed installation

Production speed
up to 1667m/min (depending on configuration)

Networkable
recipes remotely available

Installation Depth
max. 500mm

24/7 Continuous Operation
Suitable for industrial continuous operation

Product Diameter
0,5mm - 25mm
round, oval and flat

High Adjustable
cable passage height
800 - 1200mm

Random Rotation Products
insensitive to cable rotation

100% Control
for highest quality requirements

Error Length
larger 0,3mm

Process Reliable
insensitive to water drops and dust particles on the cable surface

Measuring Range IP67 Protected
measurement of wet media / easy cleaning

Functionality of the *nLine* Cable Inspection Solution

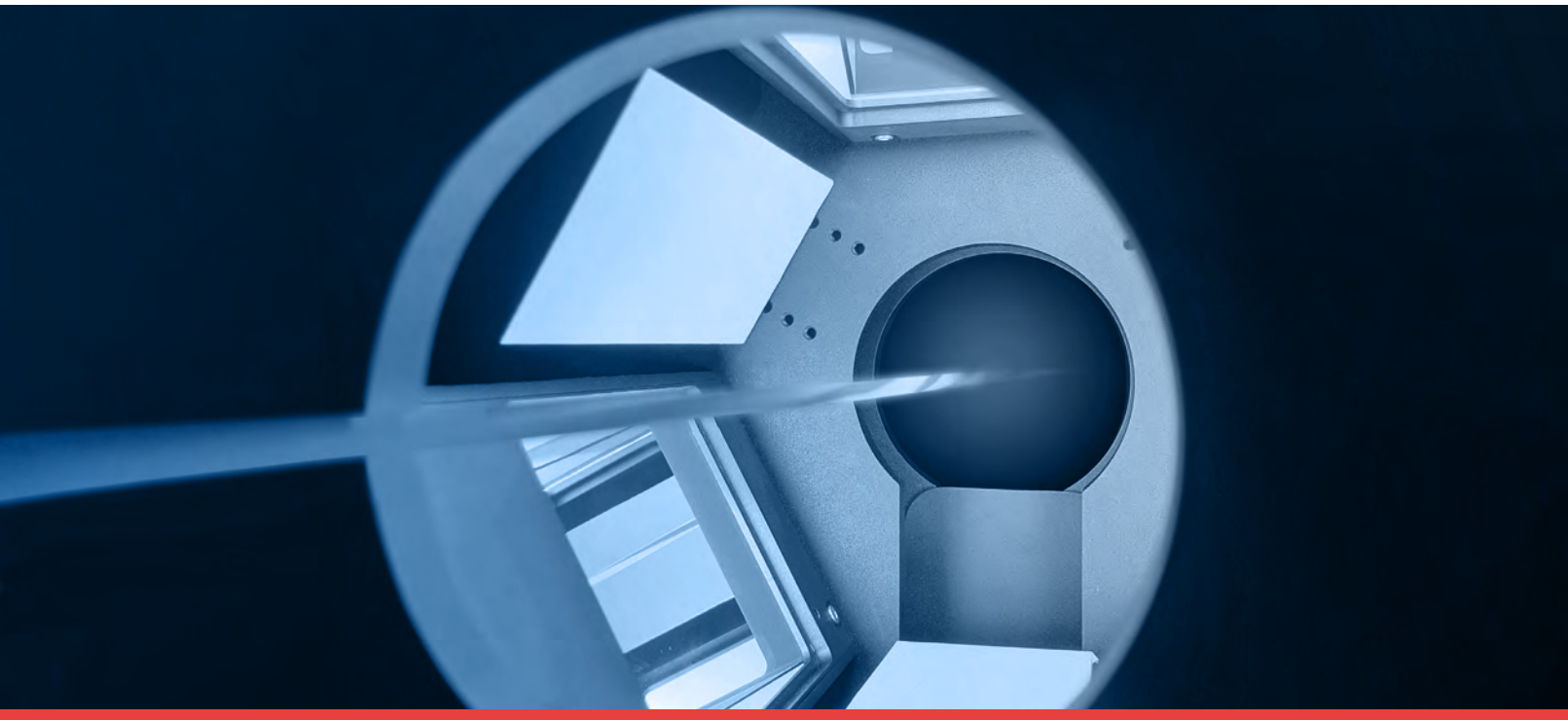
Problem

The increasing demands for already high quality standards, by the automobile industry, cause problems for error detection by means of conventional measuring and testing technology. In addition, requirements such as 100% control and traceability needs to be fulfilled.

nLine Pro

The *nLine* 360 Inline cable inspection solution was developed specifically for the extrusion industry and enables the inspection of many different product features in a single compact device. Thereby it replaces the existing measuring and testing technology which reduces investment and maintenance costs as well as integration efforts.

Three high-speed cameras monitor the complete cable surface over the entire cable length continuously.



Easy-To-Use / Plug & Play / Teach & Go

- process reliable error detection of surface defects
- easy handling and adaptation to new products incl. recipe management
- German and English menu navigation
- commissioning and cable feeding do not require any additional equipment
- single operation / one-man operation

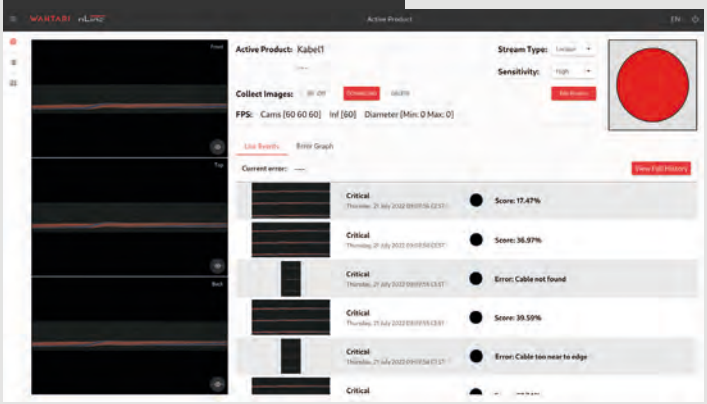
For Production-related Use in the Extrusion Sector

Rough production conditions have no negative influence on the inspection quality:

- room temperatures from 0° - 45C° air humidity 0 - 90%
- different sources of disturbing light (position of the sun, hall lighting)
- increased dust particle content and vibrations of passing logistics transporters

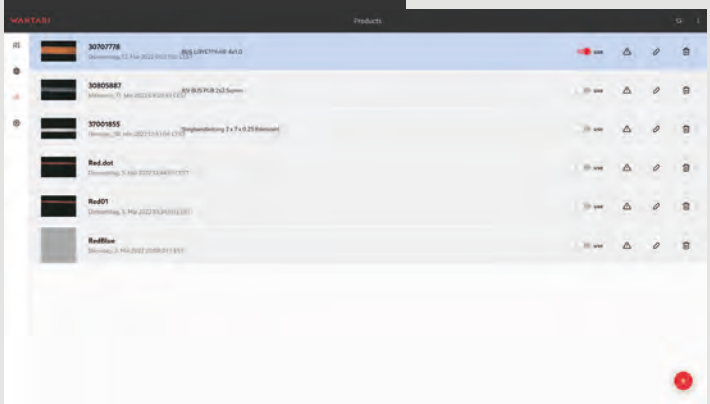
Wahtari Vision / Display Options / Features

Camera Overwiew



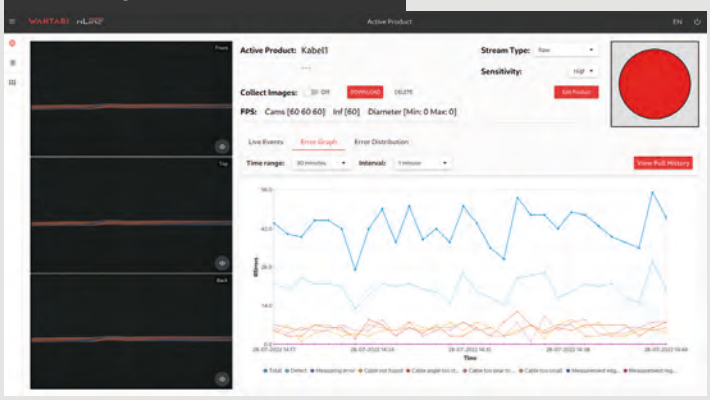
- live view of detection
- instant overview of system status
- errors are displayed in real time

Products



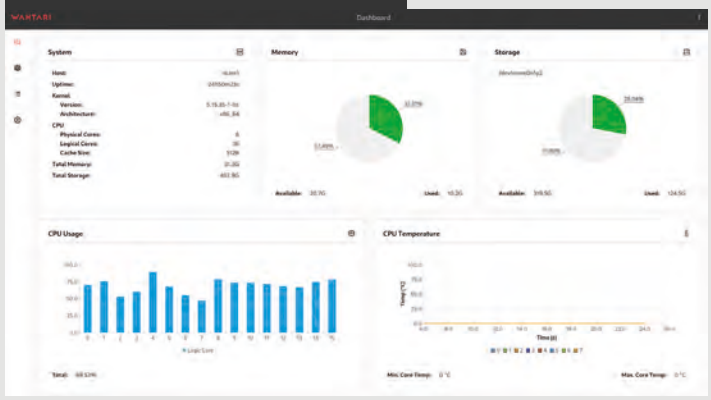
- easy product management
- quick change
- simple creation & editing of products
- detailed error history

Error Graph



- shows the current number of errors in a certain period /interval

Dashboard



- system dashboard for general overview

System Components

3x High Performance Cameras

High Performance Computer System

Special Lighting

Power - & Ethernet Cable

Advantages of the *nLine* Inspection System

High Precision
clear identification even in difficult situations

Easy-To-Use
no special training required

Extreme Performant
recording and evaluation in real time

Easy Adjustment
problem-free training of new product features

Minimal Calibration required

Edge Computing
no connection to a data center due to onboard detection

Seamless Integration
easy integration into third party applications via API

Collect Gold-Samples
Define your perfect state

Relieve Employees
more capacity for other tasks

Test Methods / Materials

- color control, single-color / multicolor
- imprints, serial numbers, barcodes, QR codes
- surfaces: smooth, matt, shiny, rough
- insulation material: PU, PVC, ETFE, and many more
- product diameter: 0,5mm - 25mm
- defect size: greater than 0.3mm

Flexible and Worldwide Applicable

- 110/220V, 50/60Hz input voltage
- compact delivery on pallet
- Soft- and firmware updates over the air (online/remote)
- multilingual

Easy Integration also into Existing System Concepts

nLine can be integrated into existing system concepts. As a mobile version mounted on a height-adjustable rolling frame or as a compact, stationary version (fixed installation). The uncomplicated commissioning requires little technical know-how. Numerous interfaces and industry standards, such as OPC UA, allow easy integration into existing system concepts while ensuring minimal latencies. Signals, e.g. for the control of signal transmitters, can be directly output via an analog signal. This simplifies the programming of system controls and complex cabling.

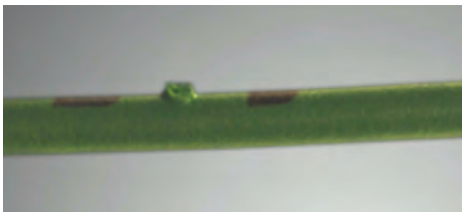
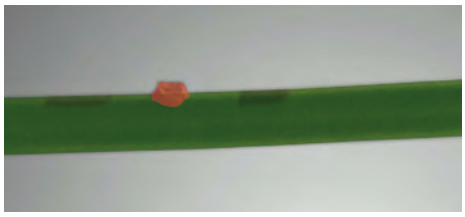
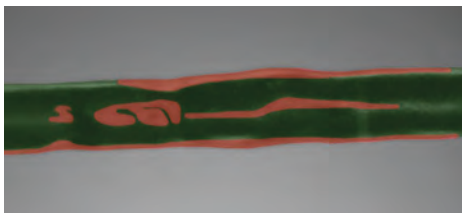
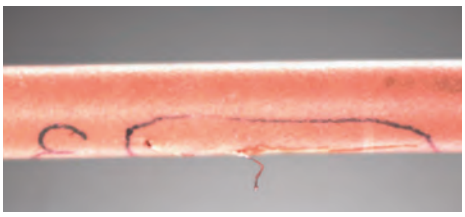
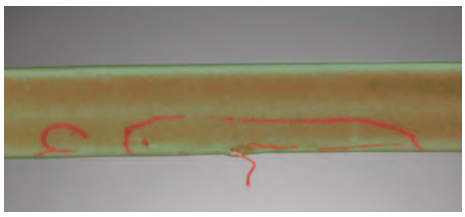
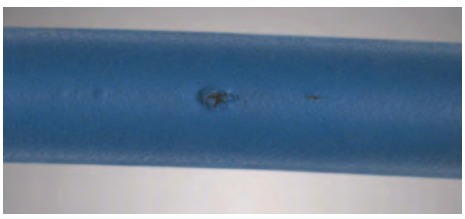
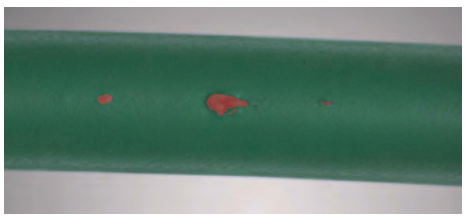
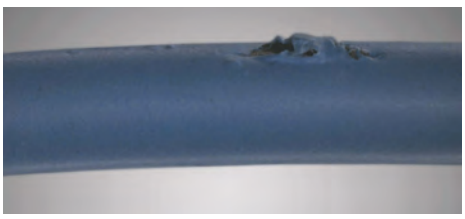
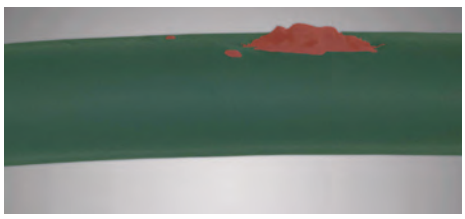
nLine in Your Company

Interested?
How to get your cable inspection solution:

1) Initialization meeting: Clarify the general conditions
2) Decide on a *nLine* standard product or we create your individual solution

Supported Error Types

Error Examples

Error Image	Error Image with mask	Error Description
		**burst pit** **surface: matt**
		**pit, dent** **surface: smooth**
		**holes, wire visible** **surface: matt**
		**dent, hole** **surface: matt**
		**blisters, burst pit** **surface: matt**

Wahtari as AI - Partner

- Experience the possibilities of the *nLine* cable inspection solution, during operation, in your company.
- Find out which solution is suitable for your situation.
- We support you with competent advice.

Wahtari's AI-based image processing solutions have already achieved significant successes with numerous customers that were considered unattainable with traditional approaches. With our AI hardware and software know-how, we look forward to supporting you too!

Sustainable Innovation with Wahtari

To enable companies to realize the full potential of today‘s AI technology and prepare for future AI developments, Wahtari has created a comprehensive AI ecosystem of hardware and software. Wahtari‘s portfolio offers everything, ranging from individual consulting to modular hardware and software components and versatile, cross-sector end-to-end solutions.

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