Q.VITEC

Recognize what is possible.

Vision Q.400 | Q.400 *[plus]*

Universal inspection software for
industrial image processing

www.qvitec.de

„OUR PRODUCTS MUST OFFER ONLY ONE THING:

THE SIMPLE ANSWER TO THE QUESTION OF OPTIMAL PRODUCTION RESULTS.“

Recognize what is possible.

The more complex the daily challenges, the higher one‘s own expectations and the greater the demands on the work performed, the more important experience and the right know-how become. Not only do we know about the complexity of machine vision, we are also aware of the almost limitless potential of this technology.

Today, image processing systems are an indispensable part of the automation of countless processes. Reliable inspections, the identification of individual components, the reading of codes or the control of entire manufacturing complexes – all this would be unthinkable without powerful image processing. In addition, there are other very practical advantages. Intelligent image processing ensures the quality of your production and helps to avoid errors. This reduces the use of materials. The consequences are increased energy efficiency and lower costs for raw materials.

Basically, advanced image processing is the foundation for optimal results in your production. This simple principle has become the guiding principle at Q.VITEC GmbH and we are firmly committed to it. Therefore, we strive to implement our experience and our passion for image processing in our solutions in the best possible way and thus to pass it on directly to our customers. In doing so, we are aware of the extremely high consulting intensity of our products. We have therefore made it our business to accompany the users of our technology in an extraordinarily customer-oriented and holistic process from start to finish. In practice, we first analyze your processes and the precise requirements for your needs. Then we create solutions to optimize your processes and integrate our components directly into your systems – individualized and custom-fit.

The most important goal is the maximum efficiency and performance of your production. Our products are merely the means to an end – albeit the optimal one.

Following this approach, we do not only attach extreme importance to sustainability, but also to the user-friendliness of our products. The focus is on ease of use and paves the way to increasing performance. At the same time, it is always important to keep an eye on developments such as the continuing increase in standardization or the ongoing trend towards miniaturization.

This is exactly what our solutions combine; framed by years of expertise and a proven awareness of practical relevance and service. Our claim is to go further where others have already reached their limits. If we see and develop a solution together with you, then it can also be implemented in practice.
We focus all our efforts on this, and in all of this we always see ourselves as the interface between intelligent technology and the immediate needs of our customers. Because our products basically have to offer only one thing: The simple answer to the question of optimal production results.

So the more complex the daily challenges, the higher your own expectations and the greater the demands on the work performed, the more Q.VITEC GmbH is the right partner at your side.

Q.VITEC

- One tool for many tasks
- From industry for industry
- Ready for any requirement
- Saves time – even during connection
- Fast development of test applications
- Security for your production

Vision Q.400

Special in many respects

Vision Q.400 – the flexible and intuitive image processing software from Q.VITEC enables you to create high-quality and powerful inspection sequences within a very short time. You do not need any programming knowledge – configuring instead of programming is the motto. As a stand-alone version, Vision Q.400 is the optimal basis for powerful OEM systems and inspection solutions. Pre-installed on our camera system Imagechecker Q.400, it shows its special strengths. All components are perfectly matched. Whether on its own or in combination with our powerful hardware, Vision Q.400 offers numerous advantages in both constellations:

1 Multifunctional

Vision Q.400 offers first-class inspection algorithms for (almost) any optical inspection or measurement task. If the internal range of functions should ever not offer the right tool, it can be expanded with new functions.

2 Fast and robust algorithms

Originating from one of the largest electronics groups in the world, we know what is important in production: speed, stability and reproducibility. This is also what the algorithms of Vision Q.400 have been trimmed to.

3 Variable

Vision Q.400 is available as a stand-alone product or installed
or turnkey installed on various hardware platforms. From the space-saving touch panel to the high-end 19“ industrial PC.

4 Grown and proven

Vision Q.400 is the product of over 15 years of continuous development and improvement. It is based on one of the world‘s largest image processing libraries.

5 Results output

Wir haben bei der Vision Q.400-Entwicklung besonderen Wert auf ein einfaches Ergebnishandling gelegt. Dieses gilt sowohl für die Parametrierung der OK/NG-Entscheidungen, als auch für die Anbindung und Handhabung üblicher Hardware-Schnittstellen.

6 Configure instead of programming

With Vision Q.400, you don‘t have to reinvent the wheel. Combine expert knowledge accumulated over decades into a professional inspection routine at the click of a mouse. Changeable at any time, because Vision Q.400 is setup and testing software in one.

7 Multiple customizable

As individual as image processing applications can be, so rich are the individualization possibilities in Vision Q.400. Indicators, ActiveX® Clients up to the integration of own inspection algorithms. Particularly interesting is the compatibility with Halcon.

The user interface

1 Menu bar

Basic settings such as opening and saving applications, selecting the frame grabber, etc. are made here.

2 Checker selection

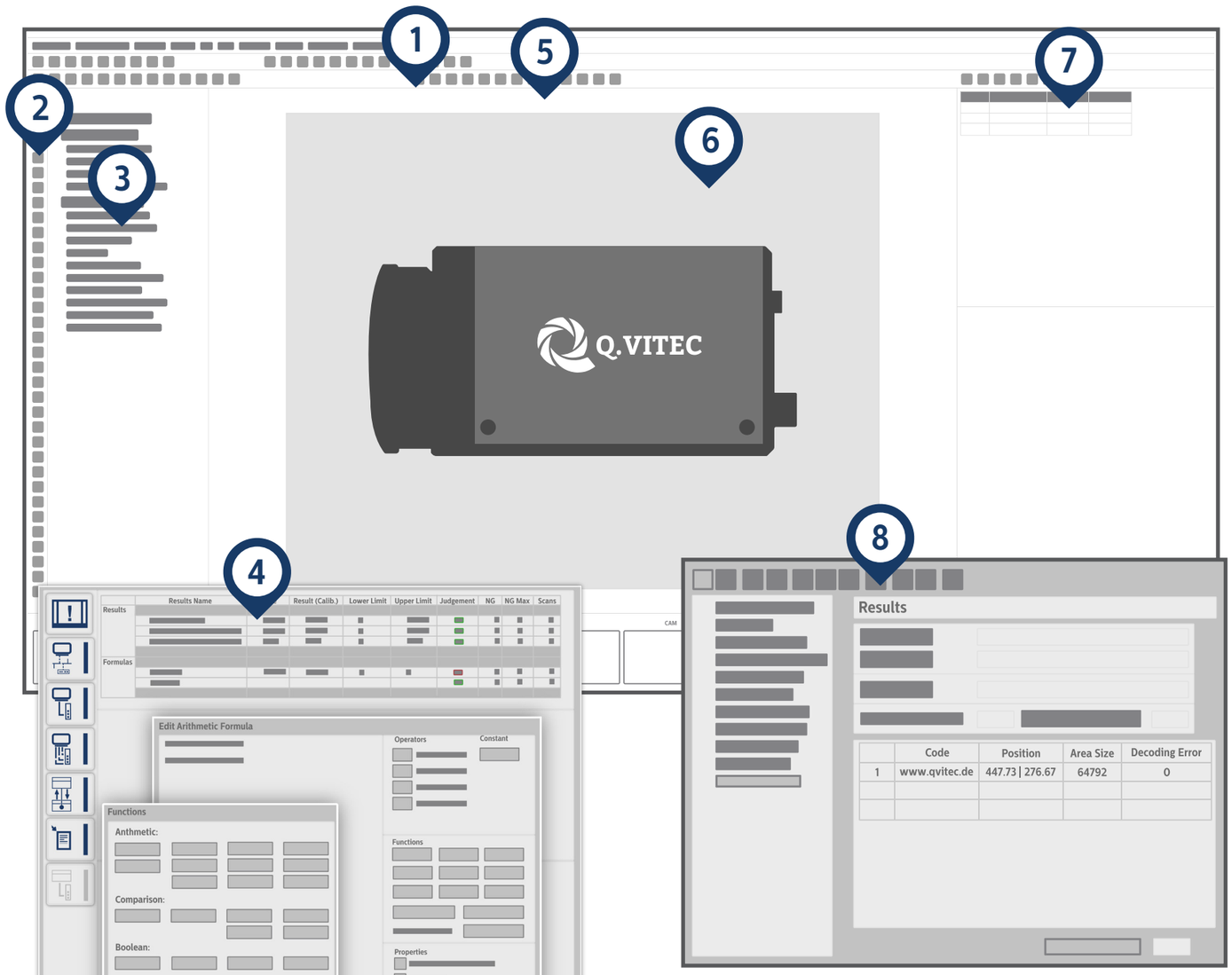
The selection of the test method as well as the positions and shapes of the test regions are made in this menu bar. It is enough to simply draw a test element in the image. Many parameters are optimized automatically.

3 Drain bar

The drain bar guides you step by step step by step through all important settings.

4 Spreadsheet

All results of the checkers are summarized in the spreadsheet. This is where the limit values are specified, calibration is performed, statistical parameters are recorded and the various interfaces are controlled. The settings are mostly made via drag & drop.



5 Process selection

Here you will find icons for changing projects, starting the application and much more. In addition, useful diagnostic tools such as error display or interface monitor are available.

6 Camera window

Each camera has its own window with associated sequence bar. The current camera image and the inspection elements are displayed here.

7 Drain strip

Gives an overview of the test elements used and their execution sequence.

8 Test elements dialog box

Each test element has its own dialog box and can be customized. Graphic displays or automatic functions often support the setup.

Fast and flexible to the perfect test

The functionality of Vision Q.400

Vision Q.400 is parameterization and inspection software in one. In the parameterization mode, you create your individual inspection routine with just a few clicks of the mouse using predefined basic functions and practice-oriented inspection modules – the so-called „checkers“. You also define the decision limits for „good“ and „bad“ there and make the settings for the cameras and interfaces used. After switching to the inspection mode, the system waits for a trigger signal (internal or external) to start the inspection sequence.

Switching between these two modes is possible at any time. This gives you the flexibility to quickly and easily adapt inspection programs to new process conditions or product variants, e.g. directly at the production line.

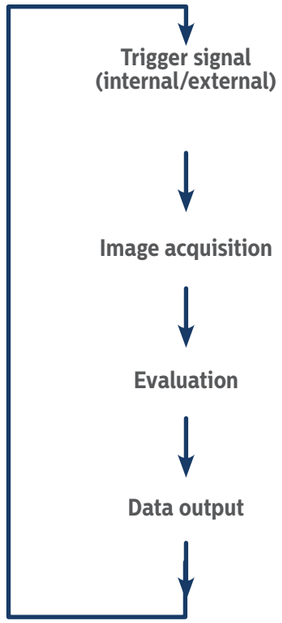
Vision Q.400 is also available as a simulation version and as such allows you to create and test your application from the office – even without a special computer and without cameras.

PARAMETERIZATION MODE
Creates a new test program

AUTOMATIC TEST MODE
Parts are continuously inspected against the criteria in the inspection program

1. **Define basic settings (variants, cameras, etc.)**
2. **Test tools and set up sequence**
3. **Define limits**
4. **Configure interfaces**

Change between parameterization and test mode is possible at any time.



The »Checkers«

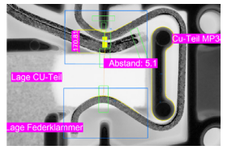
Testing tools per mouse click

In Vision Q.400, „Checker“ is the synonym for an adjustable inspection tool that can perform various tasks depending on its use. Vision Q.400 already includes the following checkers in its standard scope of functions:

- Brightness-correction
- Attendance check
- Image subtraction
- Character Recognition
- Position tracking
- Feature recognition
- Contour comparison
- Code reading
- Automatic test form
- Edge recognition
- Cross-correlation-comparison
- Measurement / Geometry

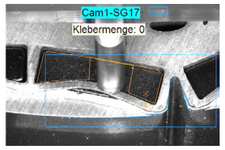
The checkers work with both gray-scale and color cameras. You can use them to solve a wide variety of inspection tasks. The following are some typical examples:

Dimensional accuracy test



High-precision measurement of e.g. distances, angles, radii, diameters and areas. Up to a repeatability of 1/20 pixel or a few micrometers can be realized.

Attendance/completeness check



Presence check detects missing or unwanted details, so objects can also be classified & sorted.

Object / Pattern Recognition

Patterns or structures can be easily detected using various methods. Contour comparison can be used to detect overlapping features or features that vary in size and shape.

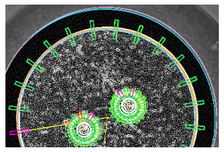
Position / attitude detection

Precise position information (e.g. for pick & place) is transferred to a handling robot by means of accurate position transmission.

Read characters (OCR/OCV)

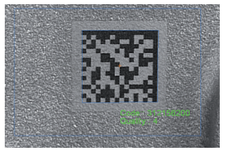
With taught-in fonts, the algorithm recognizes even hard-to-read characters (e.g. dot-matrix / direct part marking) without any problems.

Surface/print image control



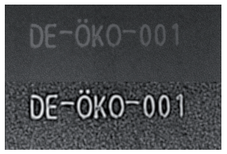
The detection of the smallest breakouts or defects is one of the most demanding inspection tasks. Vision Q.400 offers several efficient and fast solutions for this.

Determine code content & quality



Vision Q.400 reads a wide range of bar codes and 2D codes. Optionally, the code quality is determined and output according to ISO/IEC 15415 or AIM DPM-1-2006.

Image optimization/filtering

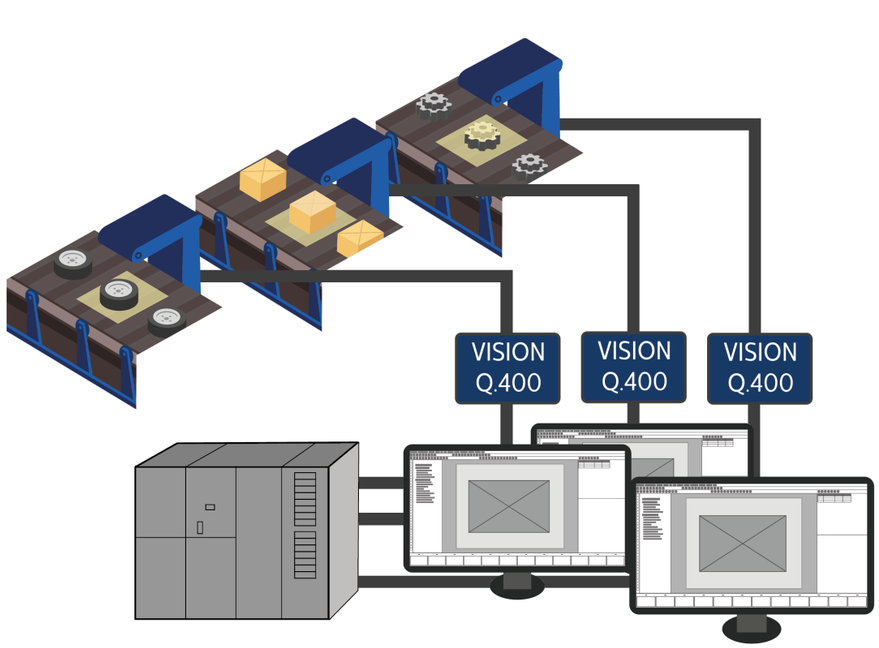


Various algorithms in Vision Q.400 enable the optimization and preparation of such images before they are subjected to the actual inspection process.

The big plus for unsynchronized part feeders:

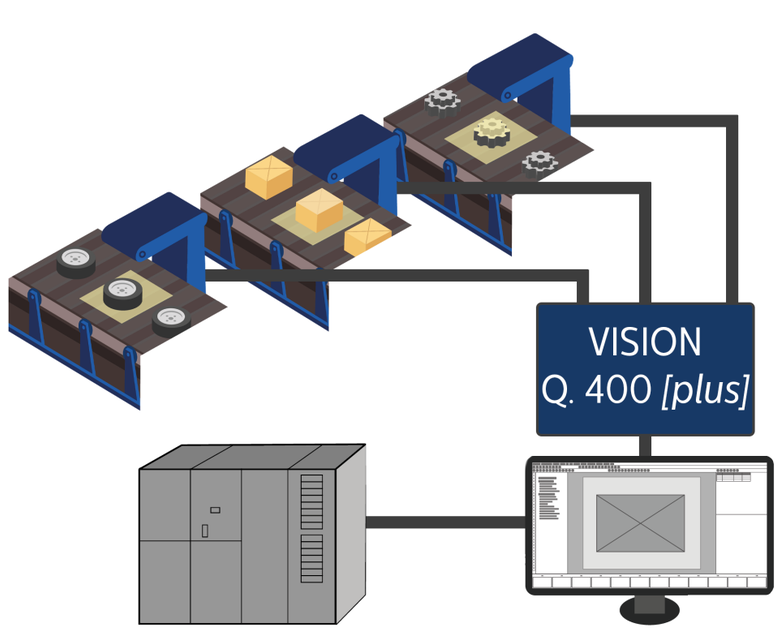
Image processing for independent testing

With Vision Q.400 [plus], you can perform up to 12 independent inspection processes with just one image processing PC. For this purpose, the connected cameras are divided into subordinate inspection projects within the respective overall application, which can be started at independent times. The image processing system behaves practically as if several independent image processing computers were in use. The fast computers with multiple processor cores available today can thus be used efficiently and no longer spend the majority of their computing time waiting for the next inspection run.



Vision Q.400 *[plus]*

This saves hardware and operating costs and also enables smaller control cabinets with less installation work. Vision Q.400 [plus] is also available in Basic, Advanced and Professional packages and can be expanded with modules. In addition, Vision Q.400 [plus] can be scaled according to the required number of simultaneous tests.



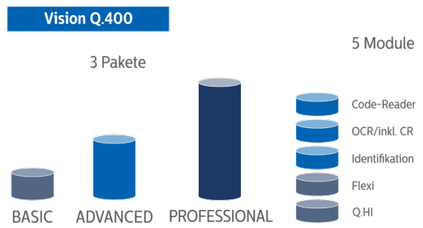
Vision Q.400 License model

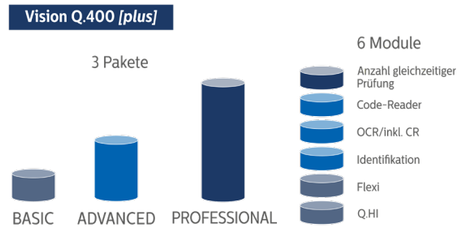
	Vision Q.400			Vision Q.400 *[plus]*		
	Basic	Advanced	Professional	Basic	Advanced	Professional
Kamerafunktionen:						
Farbe	Ja	Ja	Ja	Ja	Ja	Ja
Größe	Alle Größen	Alle Größen	Alle Größen	Alle Größen	Alle Größen	Alle Größen
Line-Scan	Ja	Ja	Ja	Ja	Ja	Ja
Checker (Prüfwerkzeuge):						
Geometrie	✓	✓	✓	✓	✓	✓
Indikator	✓	✓	✓	✓	✓	✓
Kamera-Schwellwerte	✓	✓	✓	✓	✓	✓
Weißabgleich	✓	✓	✓	✓	✓	✓
Positions-Rotations-Korrektur	✓	✓	✓	✓	✓	✓
Objektform	✓	✓	✓	✓	✓	✓
Prüffenster	✓	✓	✓	✓	✓	✓
Merkmalsgewinnung	✓	✓	✓	✓	✓	✓
Binäre Kantenerkennung	✓	✓	✓	✓	✓	✓
Grauwert-Kantenerkennung 1 u. 2	✓	✓	✓	✓	✓	✓
Bildsubtraktion	–	✓	✓	–	✓	✓
Konturvergleich	–	✓	✓	–	✓	✓
Kreuzkorrelationsvergleich	–	✓	✓	–	✓	✓
Code-Leser	1 2	1 2	✓	1 2	1 2	✓
OCR	2	2	✓	2	2	✓
Identifikation	3	3	✓	3	3	✓
Asynchrone Bildauswertung	–	–	–	✓	✓	✓
Systemeigenschaften:						
Begrenzung der Checker-Anzahl (Prüfwerkzeuge) je Applikation	keine Begrenzung	keine Begrenzung	keine Begrenzung	keine Begrenzung	keine Begrenzung	keine Begrenzung
Q.CX-Schnittstelle (ActiveX)	Ja	Ja	Ja	Ja	Ja	Ja
Max. Anzahl der Kameras	2 4	2 4	12	2 4	2 4	12
Schnell umschaltbare Ausführungsgruppen	Nein 4	Nein 4	Ja	Nein 4	Nein 4	Ja
Bedingte Verzweigung (If-case)	Nein 4	Nein 4	Ja	Nein 4	Nein 4	Ja
PIO-Unterstützung	Ja	Ja	Ja	Ja	Ja	Ja
Anzahl der Aktionen (Spreadsheet)	1 4	1 4	keine Begrenzung	1 4	1 4	keine Begrenzung
Q.HI-Freischaltung	Nein 5	Nein 5	Ja	Nein 5	Nein 5	Ja

1 CODE-READER-Modul 2 OCR-Modul 3 IDENTIFICATION-Modul 4 FLEXI-Modul 5 Q.HI-Modul

Basic packages and expansion modules

Take advantage of the freedom to optimally design the performance of Vision Q.400 according to your requirements.
Even the Vision Q.400 Basic package masters simple inspection tasks with high precision. Vision Q.400 Advanced expands the possibilities to include fast object identification. With extension modules, you can expand „Basic“ and „Advanced“ step by step up to the full scope of Vision Q.400 Professional. Vision Q.400 Professional offers full flexibility even for the most demanding tasks with up to 12 cameras, for prototypes or if you value the security of being able to react quickly at any time to subsequently arising requirements. In addition, the possible number of simultaneous inspections can be defined for Vision Q.400 [plus].





1 CODE-READER-Modul

The module unlocks the code reader checker of Vision Q.400. This enables your system to read a wide range of barcodes and 2D codes. These are reliably recognized even under critical recognized. Optionally, the quality of the code can also be can be determined and output.

2 OCR-Modul (Optical-Character-Recognition)

In addition to the OCR checker, the module also activates the code reader checker of Vision Q.400. The OCR Checker enables the machine reading of texts. This applies to simple predefined fonts as well as to the recognition of special fonts that have previously been „trained“ to the system.

3 IDENTIFICATION-Modul

This module unlocks the identification checker.
It can be used to identify trained objects on the basis of characteristic features, such as texture or color. Recognition is independent of rotation, scaling, perspective, illumination changes and - within certain limits - even of deformation and occlusion. The algorithm requires textured objects as a prerequisite.

4 FLEXI-Modul

With this module, there is no longer a limit to the number of actions that should be executed depending on the result. Use up to 12 cameras! Use the clear structure of execution groups as effortlessly as the possibility of branched executions with if-case formulas!

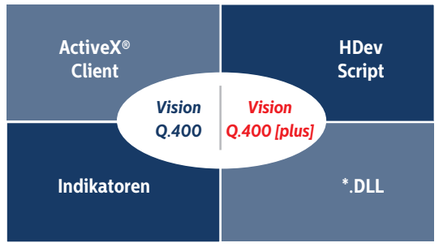
5 Q.HI-Modul (Q.400-HALCON-Interface)

With this module, your system knows almost no limits in the world of algorithms. It enables the seamless integration of HDevelop script code. Thus, you are able to completely access the established image processing library HALCON from MVTec. You can either do the programming yourself or gladly commission us with it.

6 Number of simultaneous tests

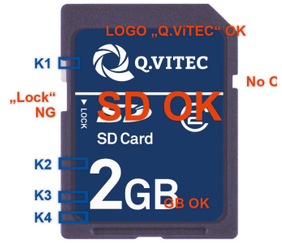
Vision Q.400 [plus] allows for inspections in up to 12 independent, asynchronous processes. Reduce costs for hardware and installation effort.

Extension options



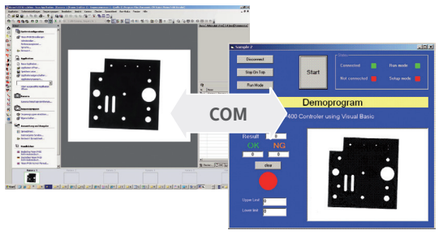
Open for the future

Vision Q.400 offers various options for individualization and expansion of functionality. The possibilities here are very wide-ranging, from customer-specific result displays to completely new inspection algorithms. In this context, the Q.HI interface (Q.400-Halcon interface), which enables easy integration of Halcon scripts, deserves special mention.



Indicators

Indicators allow you to visually highlight measured values, test results and assessments on the screen using geometric shapes, images and definable texts. Indicator elements such as lines, arrows and bitmaps can be made dependent on the actual test results. For example, a „good“ assessment could provide a different appearance than a „bad“ assessment.



ActiveX® interface

With the help of the ActiveX® interface, you can expand Vision Q.400 with an individual user interface or special statistical evaluations. Likewise, the connection to other MS Windows applications such as databases or MES systems is possible. You have access to all important parameters, measurement results and images. ActiveX® is supported by practically every programming language such as Visual C, Visual Basic, Delphi, and many more. Our detailed description and numerous examples make it easy for you to get started with programming.

HDevEngine Integration

Q.HI
HALCON-Interface
Q.400

HDevelop:
Create a new image processing routine in just a few steps.

Customized BV algorithms with HALCON

Vision Q.400 offers you the freedom to expand the range of functions virtually at will through its interface to HALCON. HALCON is one of the world's most comprehensive and powerful image processing libraries.

With more than 1600 operators, it provides you with an incredibly versatile toolbox. Using the interactive programming environment HDevelop, you can develop your individual inspection sequences from this pool and embed them in Vision Q.400 as a new „checker“ with just a few mouse clicks.

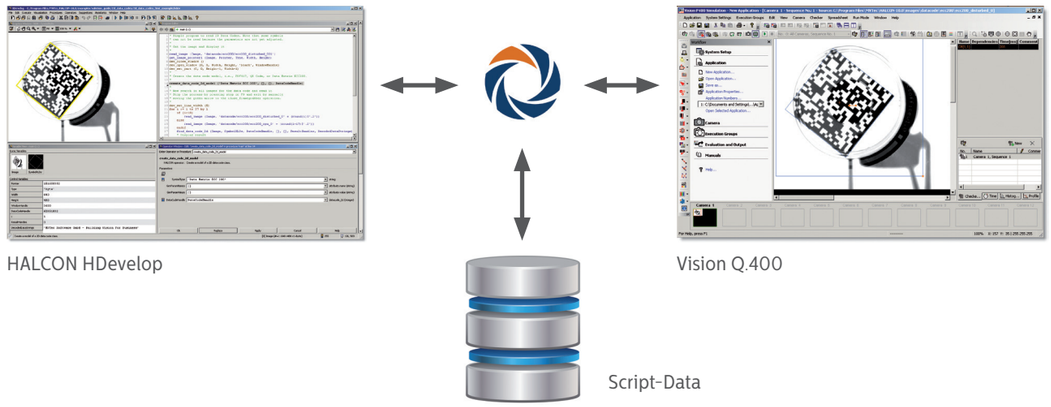
This results in the following advantages for you:

Time saving in the development of test sequences. The basis for new developments is Vision Q.400. The stable and powerful framework is already the ready-made and well-proven basic framework of a powerful inspection routine with the following basic functions:

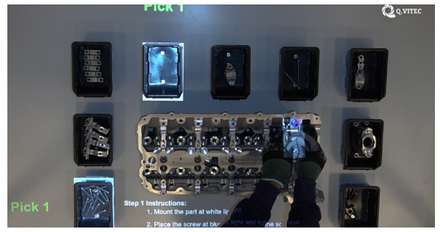
- Image acquisition
- Position correction
- Numerous BV algorithms
- Result and interface handling
- Saving of parameters, images and measured values
- Result evaluation and output

For your own developments you can use HDevelop. This allows you to develop new functionalities comfortably and impressively fast without having to deal with programming in a high-level language.

The complete HALCON functionality is at your disposal.
Vision Q.400 already includes a HALCON Runtime license.



Addon Software



V.Q Assemble

V.Q Assemble is a camera and beamer supported inspection software (solution) for assembly processes.
We ensure that the right part, from the right box, in the right order, is assembled in the right place.
assembled.

Assemblings-Plugins
Thanks to the possibility to install plugins in V.Q Assemble, the possibilities are endless. The possibilities range from a video feature, which provides a better understanding of the assembly, to pressure gauges and torque transmission of the screwdrivers.

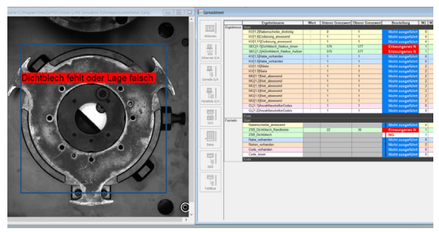
More Info

V.Qnect+

The connector between the Universal Robots Interface and the Vision Q.400 software. With V.Qnect+ you have the possibility to control and configure your familiar Vision Q.400 with the Universal Robot Teach Pendant and to optimize your workflow.

V.Qnect+ Application Example
Regardless of whether it is a matter of completeness checks, measuring tasks, object recognition, contour checks, positioning or surface inspection, Vision Q.400 covers all industrial inspection tasks. Whether stationary or on a robot makes no difference.

More Info



Assembly Client

The Q.400 Assembly Client is used for camera-supported control of assembly processes at manual workstations. At the start of assembly, inspection sequences set up in Q.400 are started cyclically. A camera monitors whether the specified assembly steps have been carried out.

These are displayed on the monitor and if the assembly is correct and complete, the next step is automatically displayed. Only after correct completion of all assembly steps is the transfer of the assembled product released.

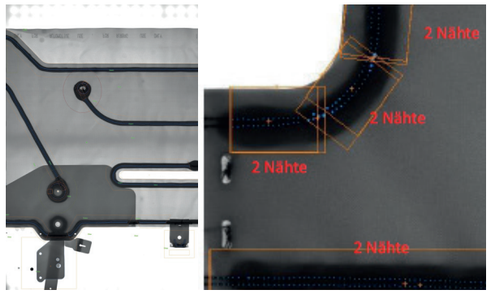
More Info

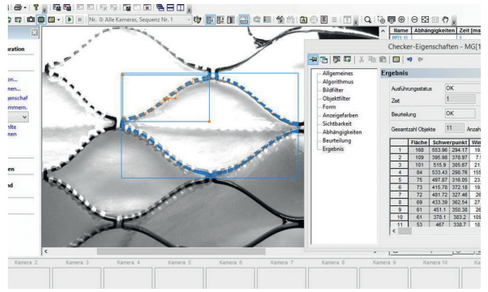
Example applications

The page shows a small selection of our applications and deployments in successful case studies from Q.VITEC practice.

Airbag testing

Industry	Automobile industry
Assignment	Inspection of silicone-coated double seams
Advantage	Increase in production/quality



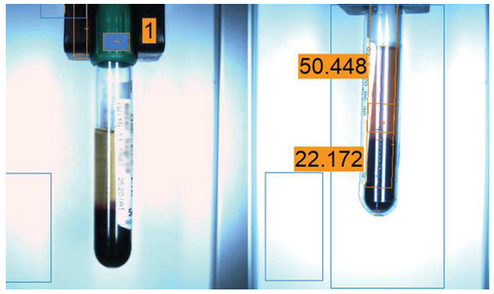


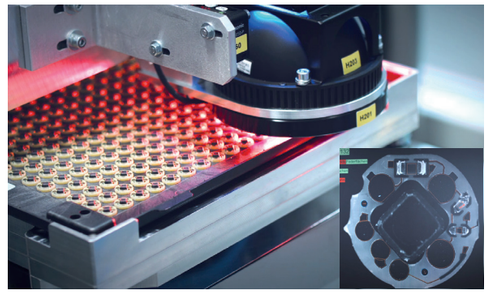
Aortic valve testing

Industry	Pharmaceutical industry
Assignment	Seam inspection
Advantage	Inspection of manually created seams

Test tube control

Industry	Pharmaceutical industry
Assignment	Fill level control
Advantage	Increase in quality





Complete PCB inspection

Industry	Electronics industry
Assignment	Surface analysis
Advantage	Component inspection

Product variations

Vision Q.400-Software

The stand-alone software package Vision Q.400 is the solution if you want to use existing industrial PCs. Optimally matched to the software, we offer you high-quality gray-scale and color cameras of different resolutions and speeds. Furthermore, Vision Q.400 basically supports cameras that comply with the GigE-Vision standard. Representative models from various suppliers have been successfully tested. Please contact us if you want to use a special camera.

Imagechecker Q.400PD/PS

Turnkey touch screen system with pre-installed Vision Q.400. Two Ethernet ports allow direct connection of GigE cameras. The compact and efficient panel PC with its touch-sensitive monitor enables installation close to the machine and convenient, contemporary operation. The price-performance ratio is also extremely attractive. The Q.400 PD/PS is available in display sizes 10“-19“.

Imagechecker Q.400SD-K01

The latest hardware from Q.VITEC is the smart camera solution. This hardware includes camera and PC in one housing. It is available as a normal image checker or as a code reader.

Imagechecker Q.400SD-R02

The controller has integrated a powerful 64-bit 4-core X86 CPU, which can run user-designed applications and image processing algorithms. The controller can work constantly under different temperature, from -40 ° C to + 80 ° C, the controller provides very stable performance.
Compared to Q.400SD R01: 50% faster CPU performance (same power consumption), 3.5x DDR bandwidth increase, 4.5x GPU performance (deep learning algorithm acceleration).

Imagechecker Q.400XD

In addition to the best computing power, the Q.400XD also offers the largest expansion options in our range. The system is particularly suitable for computationally intensive inspection tasks with optionally up to six CameraLink© cameras in parallel operation. Free slots allow the system to be expanded - for example with additional interface cards. This also offers the best prerequisites for operation with high-resolution line scan cameras - for inspecting paper or fabric webs, for example.

Imagechecker Q.400MD

The MD series is characterized by high flexibility and maximum performance. The digital Camera Link® interface guarantees interference-free image transmission. Numerous test tools make this system a reliable universal measuring tool.

Modell	CPU / RAM / HD	Camera Interface	Digital IO	OS
Q.400PD	Core™Duo P8400, 2.26 GHz 2 bis 8 GB RAM, CF 4GB, CF 8 GB, HDD 250 GB, SSD 32 GB	CameraLink / GigE (mit oder ohne PoE)	-	WIN 10 IOT
Q.400PS	Intel® AtomTM E6x0 1.3 GHz (Single core/Dual thread) 2 GB RAM, CFast card with 16 GB	CameraLink / GigE (with or without PoE)	-	WIN 10 IOT
Q.400SD(K01)	Intel Atom E3845, 1.91 GHz quad-core CPU, 4GB DDR3, 64GB	HDMI	8IN/8OUT	WIN 10 IOT
Q.400SD(R02)	Intel® ATOM™ CPU E3950 (quad-core 2.0GHz), 4GB LPDDR4-2400, Storage 64GB	4x GigE Camera Ports	8IN/8OUT	WIN 10 IOT
Q.400XD	Core™ i7/i5/i3 LGA1150 processors with Q87	CameraLink / GigE (with or without PoE)	16IN/16OUT	WIN 10 IOT
Q.400MD	Intel Core i7-6700TE 2.4/3.4 GHz, 8MB Cache, 8 GB RAM, 64 GB SSD	CameraLink / GigE (with or without PoE)	16IN/16OUT	WIN 10 IOT

Free DEMO version

Convince yourself and test Vision Q.400 with the DEMO version. The Vision Q.400 DEMO version corresponds to the fully functional simulation of Vision Q.400 and can be used for an unlimited period of time. Cameras cannot be operated with the DEMO version.

https://qvitec.de/downloads/vision-q-400-v9/

Customer Solutions

Customized solutions for individual process requirements

We offer you customized solutions even for individual process requirements. Q.VITEC accompanies you in a holistic process and develops with you exactly that solution which is tailor-made for your needs and guarantees an optimal result.

Would you like a little more? Vision Q.400 is a powerful, scalable tool with which you as a user can solve almost all industrial image processing tasks. But every now and then there are requirements that are far from any standard. Do you need a special camera, be it for thermal imaging or X-ray? Chances are good that it can be integrated.

Do you need special algorithms for your inspection? These can be integrated as additional inspection elements via our Q.HI interface, while of course all standard Vision Q.400 features remain fully available.

Does your robot require a fancy interface protocol or should inspection results appear directly in your spreadsheet? This is easy with Q.CX, our universal ActiveX interface.

We are also happy to support you in the development phase of the product to be tested in the future. After all, many tests are simply more feasible if your product has already been designed with its production control in mind. We also offer complete solutions in cooperation with our system integrators.

Everything under one roof

TEC-GROUP

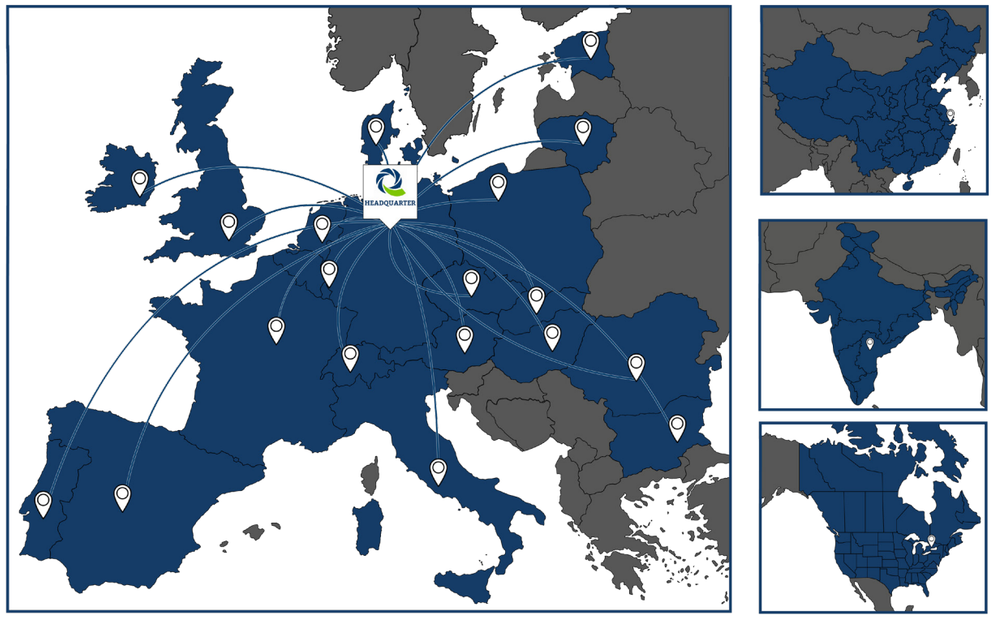
PRAUTEC Process | Automation | Technology

Q.VITEC

UNITTEC

The TEC-GROUP combines the owner-managed companies PRAUTEC, Q.VITEC and UNITTEC. We are specialized in a variety of competence fields in industrial automation. Our services range from concept creation and development to the integration of various product solutions.

Q.VITEC distribution network



Together with our strong partners, Q.VITEC GmbH can today rely on a broad and effective distribution network throughout Europe and Canada. Thanks to short ways we can react quickly to your wishes at any time and are able to develop together with you, quite flexibly, the individual solution for each of your challenges.

Q.VITEC

Q.VITEC GmbH
Hagenburger Str. 54
31515 Wunstorf

+49 (0)5031 9494320
E-Mail info@qvitec.de
Web www.qvitec.de

Q.VITEC (INDIA) PRIVATE LIMITED
N Heights • Plot No 38, Siddiq Nagar
HITEC City, Hyderabad, Telangana 500081, India

+44544584848
E-Mail info@qvitec.in
Web www.qvitec.in