

COGNEX

DVT VISION SENSORS



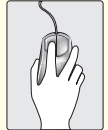
**PRODUCT GUIDE
2006**

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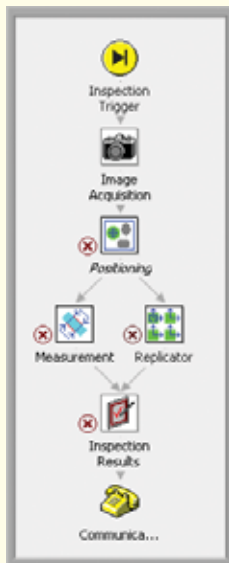
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Cognex® provides the broadest range of machine vision products in the industry. This enables our customers to meet all of their machine vision requirements with a single vendor.

To learn more about DVT® vision sensors, as well as our other machine vision product families, please visit us at www.cognex.com/products



Highlights



Intellect™ 1.3

- *New tool reference diagram makes setup quick and easy*
- *New vision tools, such as the Replicator tool, allow a broader range of applications to be solved.*
- *Vision tools have been optimized for speed. For example, the Object Locate tool runs 2.5 times faster in the Intellect 1.3 release.*

515/535/545



- *Next generation DVT vision sensors provide more speed and improved image quality*
- *Optimized for use with Intellect software*
- *Backward compatible with FrameWork software*

DVT XS

- *Capable of reading multiple forms of identification markings (1D, 2D, and OCR/OCV)*
- *Ready for verification with industry-specific grading capabilities*
- *Built in 21 CFR compliance at no charge*



Color



- *Full range of color vision sensors (high-resolution and high speed available)*
- *Dedicated color tools for color sorting, identification of parts, and precise color monitoring*

The Cognex Advantage



Customers rely on Cognex for industry leading machine vision products and application expertise – and a global network of engineers, distributors, and system integrators – that offers support wherever and whenever needed.

DVT vision sensors are low cost, full-featured vision sensors in an economical package, providing the best price/performance value anywhere. The series includes a choice of models to meet a range of performance requirements ... from simple part inspection to precise dimensional measurement. And, Intellect™ software is easy and intuitive, so customers can get their DVT vision sensor up and running quickly and easily.

As always, free training is available for DVT vision sensors at training centers throughout the world. So whether you are new to vision or an experienced user, Cognex will help ensure that your next vision project is a success.



Vision Sensors Overview

General Purpose Vision Sensors



DVT Vision Sensors:

The DVT vision sensors provide the best vision sensor price/performance value:

- Lowest cost Cognex vision sensors
- User-friendly Intellect software with Windows look and feel
- Full range of vision tools for inspection, measurement, code reading, and object location
- Unmatched vision sensor performance for color and line scan applications
- Built-in Ethernet connectivity for easy integration into the factory network



Shown with optionally-available integrated LED lighting.

DVT 515

Lowest cost, full-featured DVT vision sensor

DVT 535

Best price/performance DVT vision sensor

DVT 545

Real-time inspection at high speed

DVT 550

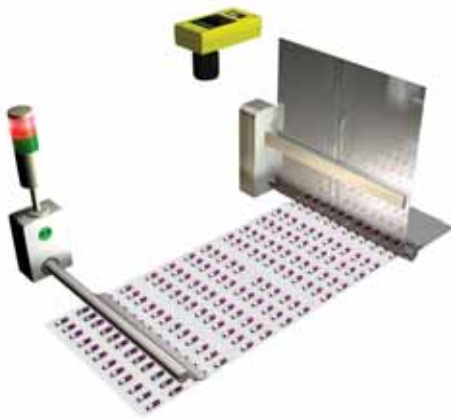
Highest speed, highest performance DVT vision sensor

DVT 554

High resolution (1280 x 1024) vision sensor detects microscopic flaws on high speed lines

Color Vision Sensors

The DVT product line offers a range of color vision sensors with both increased speed and resolution up to 1280 x 1024. Dedicated color tools in the Intellect software make applications like 24-bit color monitoring, color sorting, and identification easy for new users to deploy. Advanced users will appreciate the power of color filters, color blob processing, and the different color spaces which can be monitored.



DVT 542C

- Full featured color vision sensor capable of color part detection, sorting, or color matching

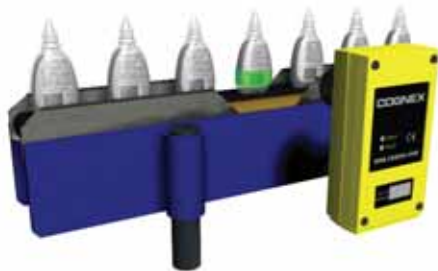
DVT 552C

- High speed color vision sensor for fast color labeling applications running at 1500ppm or faster

DVT 554C

- High resolution (1280 x 1024) and high speed vision sensor, great for precise color monitoring on high speed lines

ID Readers



DVT XS

- Only dedicated ID reader capable of reading 1D bar codes and 2D Data Matrix codes and reading and verifying OCR strings
- Easily set up mark quality assessment to ensure codes are readable to industry standards
- Built in compliance with 21 CFR Part 11
- High speed reading at 300ppm for OCR and up to 2000ppm on 1D bar codes

Line Scan



DVT LS

- The high resolution 2k by 8k imager creates a 17MB image perfect for general inspection, defect detection, gauging, or OCR/OCV
- Reduces the number of sensors required to check round objects
- Capable of super high resolution images for gauging and label inspection
- New continuous mode allows inspection of very long parts and spooled products

For more information on the DVT product family, please visit www.cognex.com/dvt

Intellect User Interface

Intellect™ is the latest software for DVT vision sensors, providing an intuitive user interface and a library of powerful vision tools. With Intellect, setting up a vision application is fast and easy, significantly lowering integration costs and speeding time to deployment.

Vision Tools

Dedicated vision tools make the setup for common applications fast and easy.

- Positioning
- Counting
- Measurement
- Color
- Defect detection
- New Replicator tool

Tool Referencing Diagram

The diagram leads a user through the inspection setup process with a graphical display from start to finish.

The screenshot displays the Intellect software interface. At the top, the menu bar includes File, Edit, View, Image, System, Product, Tool, Window, and Help. Below the menu bar is a toolbar with various icons. The main window is divided into several sections:

- Toolbox:** A vertical panel on the left containing categories like Preprocessing, Positioning, Counting, Measurement, Identification (with sub-items like Blob Identification and Color Identification), Readers, Flaw Detection, Script, and Application Specific.
- Video Display:** The central area showing a live video feed of a multi-pin connector. A green rectangular box highlights a specific area on the connector, and a red dashed line indicates a measurement or position.
- Tool Referencing Diagram:** A flowchart on the right showing the inspection process: Image Acquisition → Position → Count → Color_Check → Inspection Results → Communicate.
- Result Table - Connector:** A table at the bottom showing inspection results. It includes a 'Pixel Graph' on the left and a table of tool outputs on the right.

| Name | Output |
|--------------------|---|
| Inspection Trigger | |
| Image Acquisition | |
| Position | Distance = 24.003 pixels, X = 117.530 pixels, Y = 130.302 pixels, Angle = -3.206 degrees, Relative Angle = 89.027 degrees, Straightness = 4.031 pixel |
| Count | Count = 40, Contrast = 76.47% |
| Color_Check | Match = Color_1, Score = 100% |
| Inspection Results | |
| Communications | |

Real-time Feedback

Graphically provides data for fine tuning your application.





























Result Table

This configurable table displays a number of tool outputs including Pass/Fail rates and execution timing.

Video Display

Descriptive tool marking on the video display window helps operators understand and diagnose bad parts.

Vision Tools

| TOOL CATEGORY | ADVANTAGES | APPLICATIONS |
|--|---|--|
| POSITIONING TOOLS | | |
| <ul style="list-style-type: none">  • Position along line  • Area positioning  • Circle fit  • Line fit | <p>Positioning tools quickly locate a single part using advanced algorithms like Geometric Pattern Match, Blob, or extremely fast line tools.</p> |  <ul style="list-style-type: none"> • Locate automotive, electronic, pharmaceutical, and consumer parts and assemblies for inspection • Accurately locate a part |
| COUNTING TOOLS | | |
| <ul style="list-style-type: none">  • Count along line  • Count in area  • Replicator tool | <p>Counting tools quickly locate and count multiple parts using algorithms like Geometric Pattern Match, Blob, or extremely fast line tools for edge counting.</p> |  <ul style="list-style-type: none"> • Count parts in a package, electrical solder joints, balls in a bearing, holes in machined parts, and threads on screws |
| FLAW DETECTION TOOLS | | |
| <ul style="list-style-type: none">  • Color monitoring  • Defect detection | <p>Flaw detection tools detect small changes in part appearance or monitor color variations in several color spaces.</p> |  <ul style="list-style-type: none"> • Verify printing of labels • Verify the contents and seals of packaged goods for food, consumer, and pharmaceuticals • Ensure label color |
| IDENTIFICATION TOOLS | | |
| <ul style="list-style-type: none">  • Color identification  • Blob identification | <p>Identification tools build a model for a part based on either shape or color data for sorting applications. Models can quickly be added as new configurations are produced.</p> |  <ul style="list-style-type: none"> • Identify consistency of label color • Sort and count parts by shape on processing and packaging lines, and verify components prior to assembly |
| FILTERING TOOLS | | |
| <ul style="list-style-type: none">  • Filters | <p>Preprocessing filters allow manipulation of the image before inspection tool processing.</p> |  <ul style="list-style-type: none"> • Commonly used to increase contrast, suppress or enhance defects, sharpen edges, or change between color processing spaces. • Used on difficult applications such as glass or shiny metal |
| READER TOOLS | | |
| <ul style="list-style-type: none">  • 1D Codes  • 2D Reader  • OCR/OCV Reader | <p>Reader tools are designed to decode 1D, 2D, or OCR/OCV strings. Grading is available on both 1D and 2D codes.</p> |  <ul style="list-style-type: none"> • Reads lot codes, date codes, and identification marks in the packaging, medical, or pharmaceutical industries. |
| MEASUREMENT TOOLS | | |
| <ul style="list-style-type: none">  • Measure along line • Measure in area   • Measure in circle • Measure with points & lines   • Datum • Statistics  | <p>Measurement tools precisely gauge distances, angles, find radii, and fit lines to ensure parts are within user tolerances. Statistics and datum points can be used to monitor trends in gauging.</p> |  <ul style="list-style-type: none"> • Measure and verify tolerances of automotive parts, assemblies, and product labels • Measure critical tolerances of medical and surgical devices |




DVT Model Comparison



| | | General-Purpose Vision Sensors | | | | |
|--------------------------------|---|---|--------------|--------------|--------------|-----------------|
| | | Standard Resolution (Increasing Order of Performance) | | | | High Resolution |
| | | 515 | 535 | 545 | 550 | 554 |
| Performance Multiplier | Average overall performance vs. a Model 515 | 1X | 1.5X | 4X | 6X | 6X |
| Memory | Firmware & Job Storage | 16MB | 16MB | 16MB | 16MB | 16MB |
| Camera | Resolution | 640 x 480 | 640 x 480 | 640 x 480 | 640 x 480 | 1280 x 1024 |
| | CCD Sensor Size | 1/3 inch CMOS | 1/3 inch CCD | 1/3 inch CCD | 1/3 inch CCD | 1/2 inch CCD |
| | Color | No | No | No | No | No |
| | Acquisition Rate (frames per second) | 60fps | 60fps | 60fps | 75fps | 8fps |
| | Partial Image Acquisition | Yes | Yes | Yes | Yes | Yes |
| | Protection Rating | IP51 | IP51 | IP51 | IP51 | IP51 |
| Display Options | SmartLink to VGA | Yes | Yes | Yes | Yes | Yes |
| I/O Options | Trigger/No. of High-speed Outputs | 8 | 8 | 8 | 8 | 8 |
| | I/O Breakout/Expansion Modules | Yes | Yes | Yes | Yes | Yes |
| | Ethernet I/O Support (up to 512in/ 512out) | Yes | Yes | Yes | Yes | Yes |
| Communication Options | Ethernet & RS232 (with optional Ethernet to serial converter CON-ETS) | Yes | Yes | Yes | Yes | Yes |
| Lighting | Integrated LED Lighting Available | Yes | Yes | Yes | Yes | Yes |
| Application Development | Intellect 1.3 or higher required | Yes | Yes | Yes | No | No |
| | Compatible with FrameWork | Yes | Yes | Yes | Yes | Yes |
| Lens Mount | C or CS | Both | Both | Both | Both | Both |
| Vision Tool Support | Preprocessing | Yes | Yes | Yes | Yes | Yes |
| | Positioning | Yes | Yes | Yes | Yes | Yes |
| | Counting | Yes | Yes | Yes | Yes | Yes |
| | Measurement | Yes | Yes | Yes | Yes | Yes |
| | Identification (modeling) | Yes | Yes | Yes | Yes | Yes |
| | Readers (1D, 2D, OCR/OCV) ¹ | No | Yes | Yes | Yes | Yes |
| | Flaw Detection | Yes | Yes | Yes | Yes | Yes |
| | Script | Yes | Yes | Yes | Yes | Yes |
| Application Specific | Yes | Yes | Yes | Yes | Yes | |
| Power Consumption | Voltage Requirement | 24VDC+/-10% | 24VDC+/-10% | 24VDC+/-10% | 24VDC+/-10% | 24VDC+/-10% |
| | Maximum Current (Not including lighting) | 300mA | 300mA | 300mA | 300mA | 300mA |
| Max Oper. Temp. | Camera | 45 deg C | 45 deg C | 45 deg C | 45 deg C | 45 deg C |
| Approvals | CE, RoHS | CE, RoHS | CE, RoHS | CE, RoHS | CE | CE |

Note:

- 1) 2D codes include: Data Matrix, SnowFlake, Rectangular code
 1D Stacked codes include: Interleaved 2 of 5, Code 39, Code 93, Codabar, PharmaCode, BC412, UPC/EAN & Composite, RSS Limited, 14, Expanded, Composites A,B,C, Code 128 Composite, Postnet and Planet Code, PDF417, Micro PDF and PDF417 truncated

| |  | | |  |  |
|---|---|--------------|-----------------|---|---|
| | Color | | | ID Reader | Line Scan |
| | Standard Resolution (Increasing Order of Performance) | | High Resolution | | |
| | 542C | 552C | 554C | XS | LS |
| Average overall performance vs. a Model 515 | 3X | 6X | 6X | 6X | 6X |
| Firmware & Job Storage | 16MB | 16MB | 16MB | 16MB | 16MB |
| Resolution | 640 x 480 | 640 x 480 | 1280 x 1024 | 640 x 480 | 2048 x 1 |
| CCD Sensor Size | 1/4 inch CCD | 1/4 inch CCD | 1/2 inch CCD | 1/3 inch CCD | 2/3 inch CCD |
| Color | Yes | Yes | Yes | No | No |
| Acquisition Rate (frames per second) | 30fps | 30fps | 8fps | 75fps | 18k line per sec |
| Partial Image Acquisition | Yes | Yes | Yes | Yes | Yes |
| Protection Rating | IP51 | IP51 | IP51 | IP51 | IP51 |
| SmartLink to VGA | Yes | Yes | Yes | Yes | Yes |
| Trigger/No. of High-speed Outputs | 8 | 8 | 8 | 8 | 8 |
| I/O Breakout/Expansion Modules | Yes | Yes | Yes | Yes | Yes |
| Ethernet I/O Support (up to 512in/ 512out) | Yes | Yes | Yes | Yes | Yes |
| Ethernet & RS232 (with optional Ethernet to serial converter CON-ETS) | Yes | Yes | Yes | Yes | Yes |
| Integrated LED Lighting Available | Yes | Yes | Yes | Yes | No |
| Intellect 1.3 or higher required | No | No | No | No | Required for continuous mode operation |
| Compatible with FrameWork | Yes | Yes | Yes | Yes | No |
| C or CS | Both | Both | Both | Both | Both |
| Preprocessing | Yes | Yes | Yes | Yes | Yes |
| Positioning | Yes | Yes | Yes | No | Yes |
| Counting | Yes | Yes | Yes | No | Yes |
| Measurement | Yes | Yes | Yes | No | Yes |
| Identification (modeling) | Yes | Yes | Yes | No | Yes |
| Readers (1D, 2D, OCR/OCV) | Yes | Yes | Yes | Yes | Yes |
| Flaw Detection | Yes | Yes | Yes | No | Yes |
| Script | Yes | Yes | Yes | Yes | Yes |
| Application Specific | Yes | Yes | Yes | No | Yes |
| Voltage Requirement | 24VDC+/-10% | 24VDC+/-10% | 24VDC+/-10% | 24VDC+/-10% | 24VDC+/-10% |
| Maximum Current (Not including lighting) | 300mA | 300mA | 300mA | 300mA | 300mA |
| Camera | 45 deg C | 45 deg C | 45 deg C | 45 deg C | 45 deg C |
| CE, RoHS | CE | CE | CE | CE | CE |

Complete Range of Accessories

To simplify and speed up the system integration process, Cognex offers a wide range of optional accessories designed specifically for use with DVT vision sensors.

Lighting

In order to achieve the highest quality images possible, Cognex offers a wide array of light modules.



LED array for typical bar light applications. An optional diffuser allows it to be used as a backlight.



Lenses

Cognex offers a full range of high-quality compact camera lenses designed specifically for machine vision applications.

I/O Modules

The I/O Breakout Module provides easy connection of DVT sensors to power, acquisition triggers, and outputs and provides 8 configurable high speed I/O lines.



The Expanded I/O board has a total of 24 I/O points. There are 8 Ethernet Input points, 8 Ethernet Output points, and 8 direct wire user definable I/O points.

The Non-isolated Breakout board provides 8 configurable high speed I/O lines.



SmartLink Communications Module

Many applications require the use of multiple DVT vision sensors. The DVT SmartLink™ communications module allows monitoring images and results from those vision sensors without requiring a computer.

Using standard Ethernet or serial communications, SmartLink displays a simple operator interface on touch screen displays or inexpensive VGA monitors. SmartLink transfers images from up to 16 vision sensors, which can be linked to show inspection data, pass/fail results, and can even freeze images for operator intervention.

SmartLink point-and-click setup software allows users to easily create a custom interface to display images and



inspection results for each monitored application. In addition, SmartLink can be used as a gateway communications device for Profibus or DeviceNet connectivity.

Ethernet to Serial Converter

The DVT Ethernet to Serial Converter Kit includes: Serial Cable, Din Rail Mountable Bracket, Power Cable with flying leads and CD.



Support and Training Programs

Cognex offers a variety of Support and Training Programs to make using DVT sensors simple and intuitive.

Training

- **Classroom Courses** – Free training, offered at our training centers located worldwide, gets you up and running quickly with DVT vision sensors. Learn more at www.training.cognex.com
- **Online Courses** – Live and recorded, instructor-led courses are offered over the Internet. Access expert instruction from your office or factory location.
- **Continuing Education Credits** – Our classroom and online courses award continuing education credits for students that successfully complete these programs.



- **Lighting & Optics Instructional Video** – Helps you to improve the resolution and reliability of your vision inspection application by covering a variety of optics and lighting techniques. Available on our website and on CD.



Support

- **Download Area** – A variety of downloadable files including software updates, utility applications, integration notes, technical drawings, and support materials are available on our website.
- **Telephone Support** – Direct telephone support is provided by experienced vision engineers dedicated to assisting our customers.



Complete Family of Machine Vision Products



DVT® and In-Sight® Vision Sensors deliver proven Cognex technology in easy-to-use packages. These vision sensors are ideal for a wide range of vision tasks, including dimensional measurement, part location, assembly verification, and part identification.



PC Vision Systems combine the power and flexibility of advanced programming with the simplicity of a graphical programming environment. Cognex VisionPro® systems offer quick and powerful application development.



DataMan™ quickly and reliably reads two-dimensional codes (such as Data Matrix), 1D codes, and others that have been stamped, etched, or otherwise formed directly on surfaces of manufactured items.



Checker™ is a family of low-cost sensors designed to address specific inspection problems. Checker is the smarter sensor because it detects parts by understanding what they look like, providing unmatched inspection reliability ... without precise part fixturing or handling.



Surface Inspection Systems provide comprehensive surface and web inspection of products that are manufactured in a continuous fashion, such as metals, paper, nonwovens, and plastics. The SmartView® inspection system provides reliable detection, identification, and visualization of defects.



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