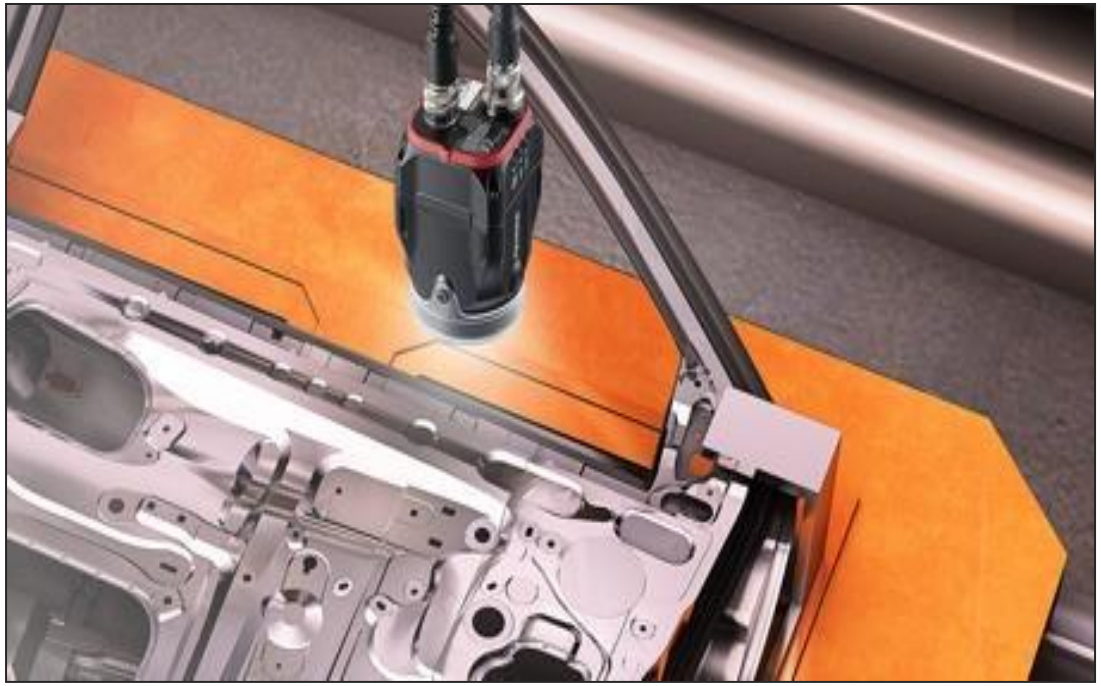
Poka Yoke Solutions for Error-proof Packing & Labeling



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SPEDE Technologies

What is Poka Yoke?

A Japanese term that means incorporating a mechanism (e.g. a technology) into a process, either to prevent errors from occurring, or to alert the operator if an error is being made so it can be immediately corrected.

SPEDE Automated Solutions:

1. Focus on *error-prevention*
2. Integrate a variety of new and legacy technologies into business processes
3. Automate and error-proof these processes:
    - Part identification
    - Part validation
    - Part counting
    - Defect detection / diverting
    - Packaging / dunnage control
    - Container labeling

SPEDE Poka Yoke Solutions

SPEDE Solutions interface to a variety of technologies:

- PLCs
- Weigh Scales
- Vision Sensors
- Conveyors / Diverters
- USB Cameras
- OCR
- Barcode and 2D scanners
- Label Printers
- Host ERP, EDI, OEE Systems

PLC-controlled Print & Apply Labeling

** Supports Poka Yoke Requirements for Honda MPR Compliance*

Poka Yoke - Using PLCs for Labeling Control

The PLC supplies the Part Nbr, Run Data, Piece Count

- Ensures the printed label matches the part being made
- Triggers a label when a pack count of “Good” Parts is reached
- Can interface to test jigs to identify Scrap
- Can use a SPEDE PLC if no production machine PLC is there

- SPEDE controls piece counts at Start of Run, End of Run
- SPEDE controls partial packs & counts at End of Run, End of Shift
- SPEDE collects PLC data for Traceability, Accountability, OEE analysis
  - Can display real-time production data at line-side on TouchScreen

Displays Real-time Production Data:

- Part Number
- Operator Nbr
- Shift, Date
- WO Nbr
- Lot Nbr
- Machine Cycles, Cycle Timestamp
- Part Counts : Good, Scrap, Re-work
- Machine Stats & Metrics, etc.

Poka Yoke - Using Weigh Scales for Labeling

Weigh scales eliminate manual counts and guesstimates

SPEDE interfaces to Weigh Scales

- SPEDE receives weight for piece counting or full pallet validation
- Adjustable tolerances accommodate piece weight variances
- Automatically prints a label when weight/count is correct
  - Option: displays “print button” on Touchscreen when weight/count is correct
  - Operator touches “print button” to print the label
- Actual weights are collected and stored with label data in the Label Database
- Optional integration with Vision can provide:
  - Vision-check to ensure part is correct
  - Weight verification to ensure part is placed in dunnage

Weigh Scale Can Trigger Labels to Print

Poka Yoke - Using Vision Sensors for Labeling

Vision Sensors can prevent errors in identifying, counting and packing parts

Keyence Vision Sensor

SPEDE uses Vision Sensors for:

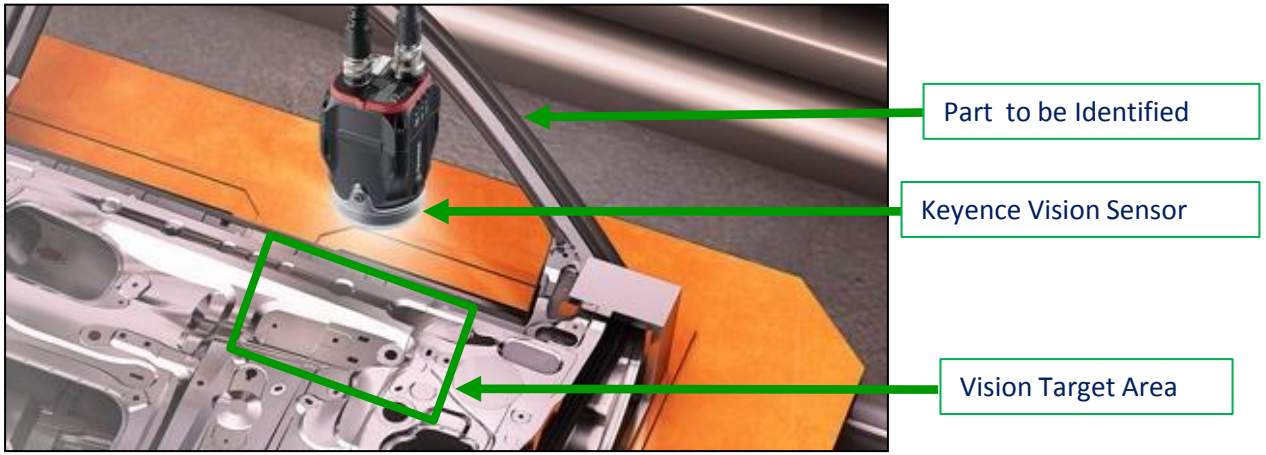
- Pack and Re-pack control
- Part Validation: Is this part good, scrap or rework?
- Part Verification: Is this the correct part for this process?
- Part Counting for accurate Pack Count
- Kit Validation: Is this Kit complete and correct?
- Dunnage layer validation: are all slots filled in this layer?
- Can also read 2D serial on individual parts for accurate counts and serial traceability

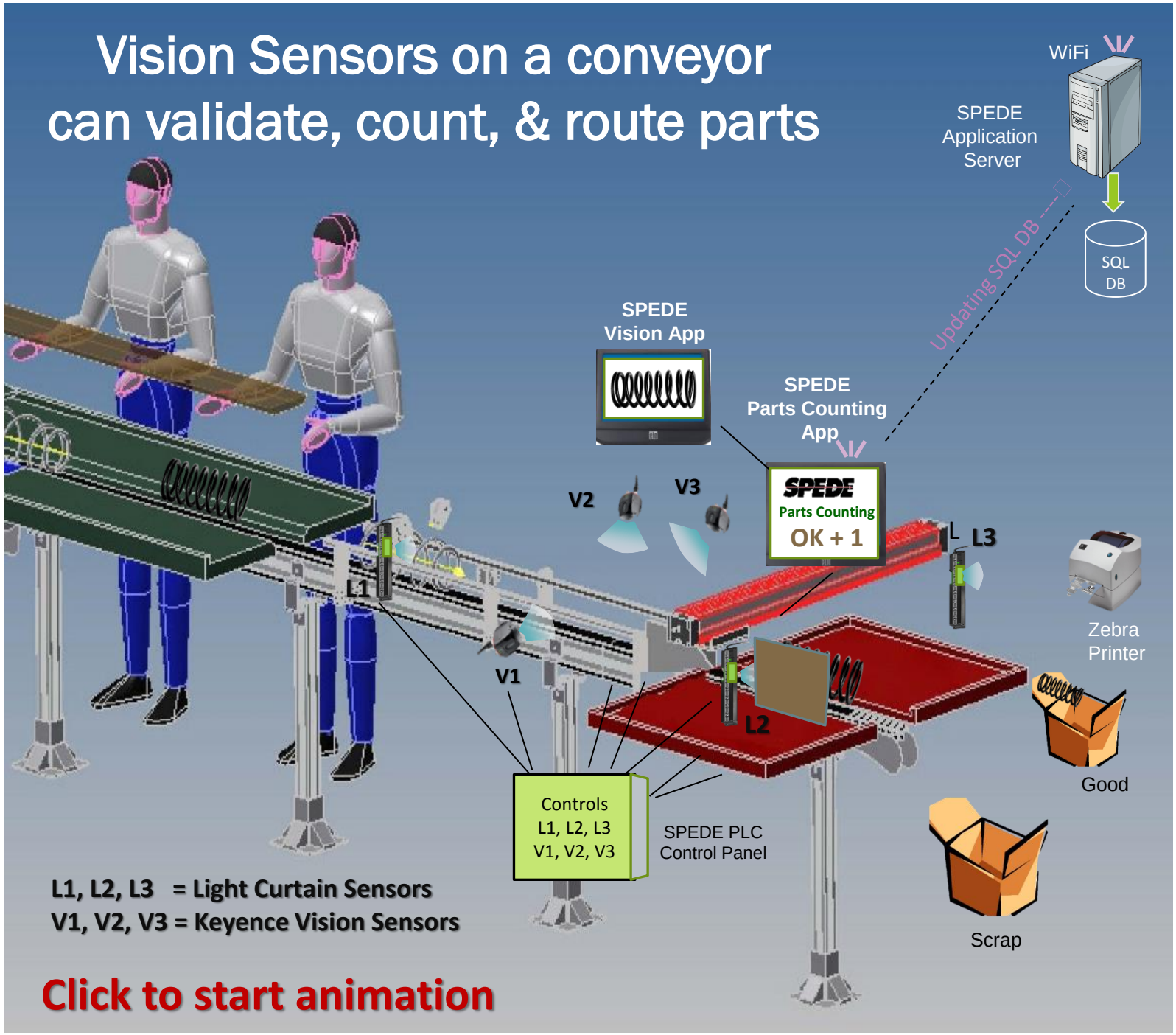
Vision can detect open slots in this Jack Kit

Vision Sensors for Error-proof Packing

How SPEDE Uses Vision

- Vision Sensor is “trained” to recognize a part number by its unique attribute
- At Packing, the part is moved under the sensor
- Sensor uses image capture & pixel analysis to identify the part
- If part is correct, the running part count is incremented
- If part is wrong, an audio/visual signal prevents a packing error
- When pack count is reached, SPEDE prints a container label

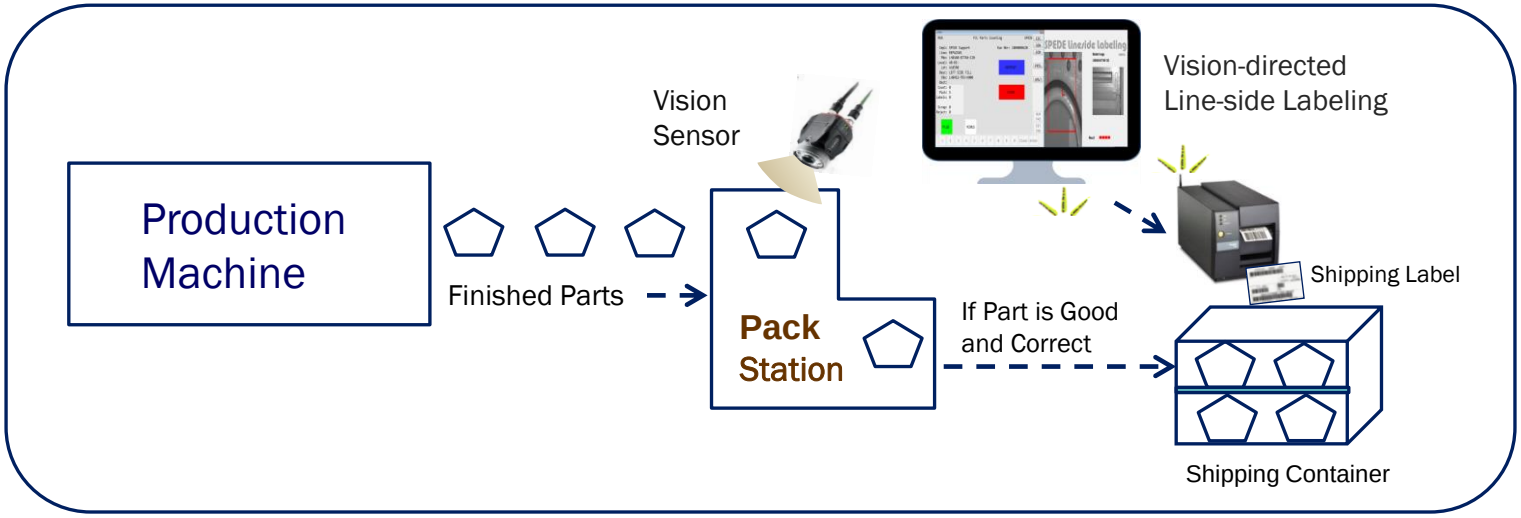



Vision Sensors on a conveyor
can validate, count, & route parts
WiFi
SPEDE
Application
Server
SQL
DB
Updating SQL DB
SPEDE
Vision App
SPEDE
Parts Counting
App
SPEDE
Parts Counting
OK + 1
V2
V3
L1
L2
L3
V1
Zebra
Printer
Good
Scrap
Controls
L1, L2, L3
V1, V2, V3
SPEDE PLC
Control Panel
L1, L2, L3 = Light Curtain Sensors
V1, V2, V3 = Keyence Vision Sensors
Click to start animation

Using Vision for Accurate Packing

Diagram of Vision-directed Packing / Labeling

- Use Vision when Parts are packed at the production machine
- Use Vision if no PLC is present to count the parts
- Vision sensor identifies and counts “good” parts
- Operator can press a Touchscreen to record scrap
- SPEDE prints the container label at pack count of good parts

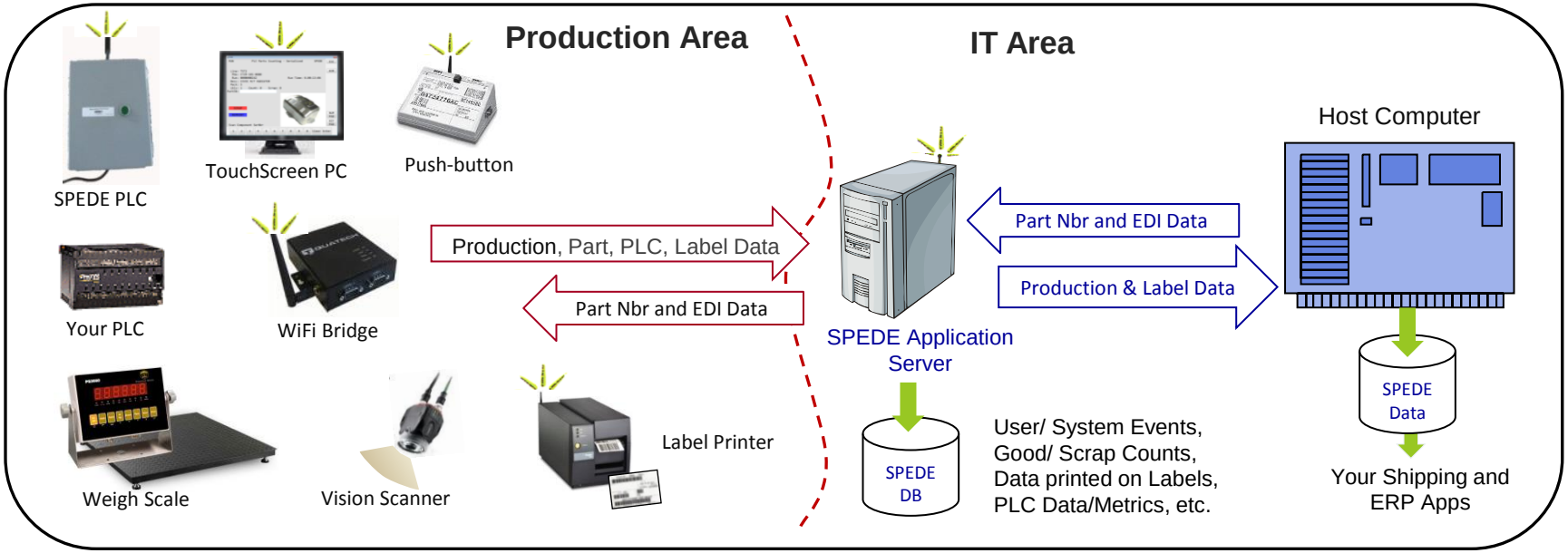


Using USB Cameras to Control Packing

SPEDE interfaces to a USB Camera at Packing

- Camera captures image of the part being packed
- Verifies the part is correct
- Validates the part is “good” vs. scrap
- Validates Dunnage layer is filled before starting next layer
- Takes a photo of the completed layer
- Video can provide proof that packing requirements were met for each layer, in case of customer inquiry

Interfacing to Devices and Host Systems



SPEDE Server Hardware Requirements

- Local Windows server, MS SQL, 500GB Hard Drive, remote access

Local Network Requirements

- TCP/IP to SPEDE Server
- TCP/IP to production PLC
- Prefer WiFi to SPEDE server, wired ethernet to PLC

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To Discuss Your Line-side Project...

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About Us:

SPEDE Technologies is a software and systems company specializing in solutions for automotive suppliers since 1980. Our focus is automating Production Area processes to increase efficiency, eliminate errors and improve profitability.

Our Customers are mid-size to Fortune 500 auto suppliers with multiple plant sites throughout the U.S. and in Mexico. They rely on SPEDE Automated Line-side Solutions to keep their mission-critical processes running smoothly, 24/7.

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