APPLICATION // 09

Carton inspection and pallet label verification at the end of the line

Carton inspection for unit counts in open cases and case orientation, plus case and pallet label verification against your PLC, MES or WMS data.

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// SHORT ANSWER

Carton inspection and pallet label verification are end-of-line camera checks: each case carries a readable label whose content matches the order or production data, faces the right way and, while still open, holds the right number of units; each pallet label carries the SSCC the warehouse expects. It cannot count inside a sealed opaque case, and pallet label checks need labels in defined positions. Reading a barcode confirms its content; it does not grade its print quality.

// WHAT IT CHECKS

What a carton inspection system checks

Four checks, often split over several positions of one carton inspection machine or station, including end-of-line pallet inspection before wrapping or dispatch. Which you need is set at the sample test.

01 // COUNT

Units in an open case

Counts units or slots while the case is open and compares the result with the SKU count.

NEEDS

Units visible from above, before the flaps close

02 // LABEL

Case and pallet labels

Shipping label present on the expected face, readable, and carrying the content expected for that case or pallet.

NEEDS

A defined label face and position

03 // ORIENTATION

Case orientation

Case the right way round before the labeller or palletiser, judged from label, print or flaps.

NEEDS

A visible difference between orientations

04 // DATA

Match against expected data

Read content compared with the order, batch or pallet ID held by the PLC, MES or WMS.

NEEDS

An agreed data source and message format

Where each check is feasible

SITUATION	CAMERA CHECK	CONDITIONS

SITUATION	CAMERA CHECK	CONDITIONS
Open case, one visible layer	Usually feasible.	Check after the case packer, before the sealer.
Open case, several layers	Top layer only.	Check each layer as it goes in, or weigh the case.
Sealed, opaque case	Count not feasible.	Count before sealing or weigh. Labels and orientation can still be checked.
Case or pallet labels	Usually feasible.	Labels on known faces and zones; cases singulated, pallets at a defined stop.
Cases inside a built pallet	Not feasible from outside.	Only outer faces are visible; check cases before stacking.

We check what your case packer, labeller and palletiser produce. We do not supply that equipment, robot palletising or AMR transport.

// IN YOUR WORDS

Mixed cartons, wrong batch on the case and pallet label errors

How end-of-line faults are reported, what carton inspection and pallet label verification check, and where they stop.

WHAT THE LINE REPORTS	WHAT A STATION CHECKS	WHERE IT STOPS
“Mixed cartons”, “wrong flavour mixed in the box”	Open-case check before sealing: each unit is counted and its type confirmed from the print or label seen from above.	Units must be visible and look different from above; identical tops need a code or colour cue.

WHAT THE LINE REPORTS	WHAT A STATION CHECKS	WHERE IT STOPS
“Case received with the wrong batch code”, “use-by date on the product differs from the outer carton”	The case code is read (OCR/OCV) and matched to the batch running; unit codes are read at the unit station, so the two can be compared.	The comparison needs both codes read on the line and a shared data source.
“Order rejected at the distribution centre because a barcode would not scan”	Every case and pallet label is read at line speed; a no-read or wrong content is a fail and the case is diverted.	A read at our reader is not a verifier grade; formal print quality needs a verifier.
“Pallet label on the wrong pallet”, “cartons sent to the wrong warehouse”	The SSCC on each pallet label is read and matched to the pallet expected by the WMS before release; both labels can be compared.	If the WMS expects the wrong pallet, the label matches it and the error passes.
“Missing, broken or leaking containers in the case”	Open-case count and visible damage on the top layer.	Leaks and damage below the top layer are not visible.

// LIMITS

Where carton and pallet verification stops

We agree these boundaries before a project starts, so nobody expects the camera to do what it cannot.

× Not covered by this station

- **Counting inside sealed cases.** Count before sealing, or weigh the case.

✓ Works reliably when

- **Cases arrive singulated.** Gaps between cases and a known label face.

- **Labels in random places.** Labels anywhere on a wrapped pallet are not read reliably.
- **Wrong data at source.** If the WMS or MES expects the wrong ID, the label matches it and the error passes.

- **Label positions are fixed.** The labeller places every label on the same face and zone.
- **Expected data arrives automatically.** From the PLC, labeller, MES or WMS, not typed in at each order.

// GS1 AND RETAILERS

SSCC pallet labels and barcode quality for South African retailers

What the GS1 rules require on case and pallet labels, and what an in-line station can and cannot prove.

Case and pallet labels are read by the customer's scanners at the receiving dock, so the GS1 rules for logistic labels matter as much as your own data. Three points decide what a pallet label verification station has to check:

- **The SSCC is the single mandatory element** on every GS1 logistic label, carried in a GS1-128 barcode. It is the number the station matches against the pallet the WMS expects.
- **Minimum print quality:** the GS1 General Specifications set 1.5/10/660 (ISO grade C) for barcodes in general distribution, including ITF-14 and GS1-128. Grading to that level needs a verifier; the station confirms each label decodes with the right content.
- **Listing and receiving:** GS1 South Africa tests barcodes to ISO/IEC 15416 and states that many retailers require its Barcode Test report when a product is listed. GS1 UK notes that unscannable barcodes cause delays and returned goods, and that a scanner only reads a code while a verifier checks its quality.

SOURCES FOR THIS SECTION

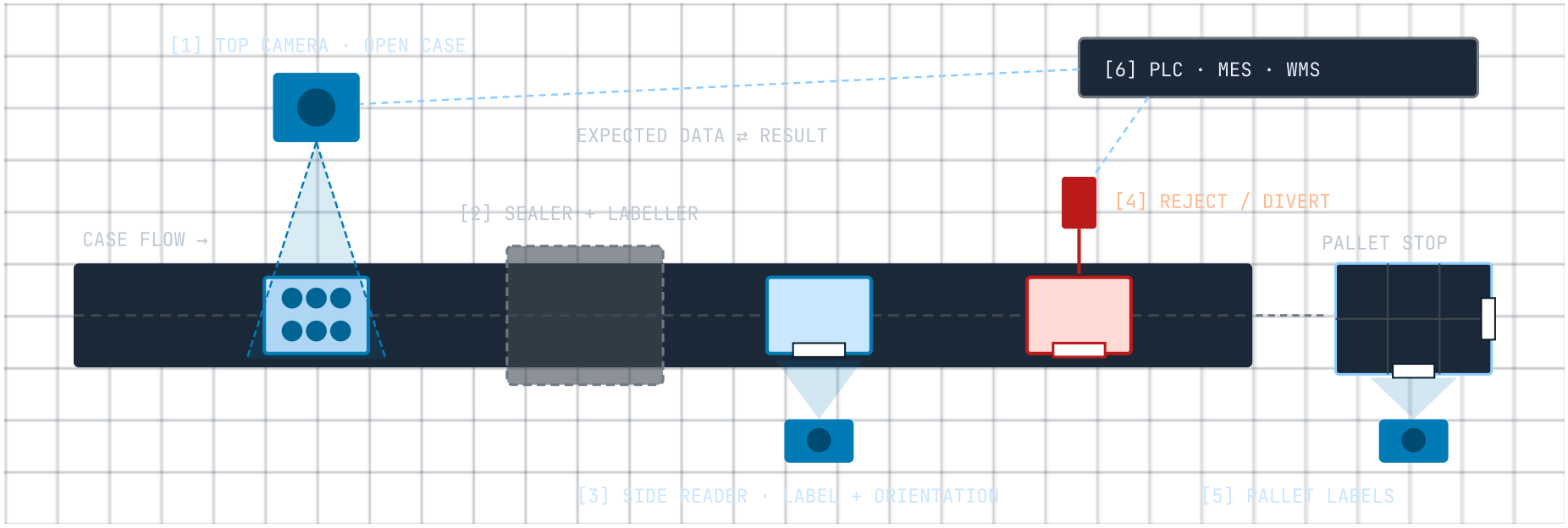
1. GS1 General Specifications 2026: logistic label (SSCC, GS1-128) and minimum symbol quality (https://gs1za.org/wp-content/uploads/2026/05/GS1-General-Specifications-2026.pdf) (GS1, read 2026-09-25)
2. GS1 South Africa: barcode verification service (https://gs1za.org/solutions/barcode-verification-service/) (read 2026-09-25)
3. GS1 UK: how do I check barcode quality? (https://www.gs1uk.org/knowledge-hub/barcodes/how-do-i-check-barcode-quality) (read 2026-09-25)

// STATION LAYOUT

How the checks are laid out at the end of the line

Plan view of a typical arrangement. The real positions follow the site survey.

[Schematic] PLAN VIEW · NOT TO SCALE



[1] Top camera: counts units or slots in the open case before sealing.

[2] Sealer and labeller: your existing equipment.

[3] Side reader: reads the case label and confirms its face, which checks orientation.

[4] Reject or divert: removes failed cases, tracked by the PLC.

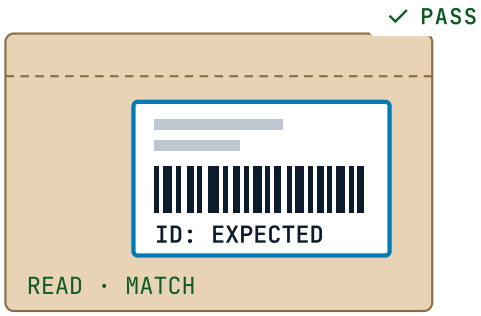
[5] Pallet label reader: reads pallet labels at a defined stop.

[6] PLC, MES, WMS: supply the expected data and receive every result.

// PASS AND REJECT [Illustrative examples]

What a pass and a reject look like

Illustrations, not images from a real line.

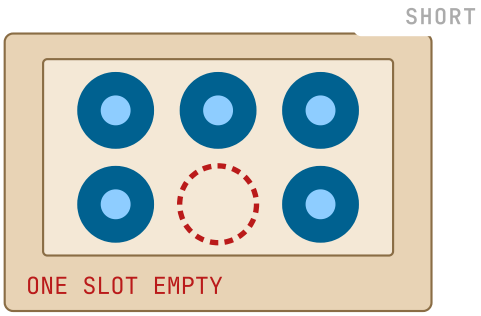


EXAMPLE // SHIPPING CASE

Label matches

The label is on the expected face, the barcode reads, and its content matches the order held by the WMS.

READ: MATCH ACTION: PASS

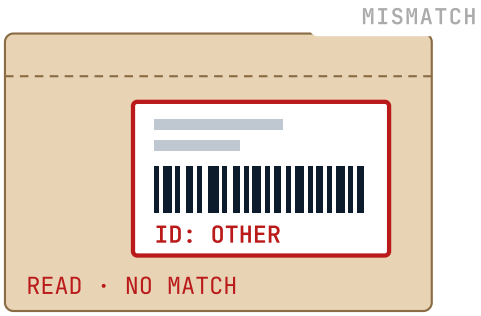


EXAMPLE // OPEN CASE

One unit missing

The case holds fewer units than the SKU count. Caught before the sealer closes the flaps.

COUNT: ✗ BELOW SKU COUNT ACTION: REJECT



EXAMPLE // SHIPPING CASE

Wrong label content

The label reads but carries an ID from another order, typical when a labeller queue gets out of step.

DATA: ✗ NO MATCH ACTION: DIVERT / ALARM

// DATA INTERFACE

Where the expected data comes from, and what happens on a mismatch

The camera reads; the comparison needs data from your systems. Changes on the MES or WMS side are made by your IT team or supplier.

SYSTEM	ROLE IN THE CHECK
Line PLC	Selects the SKU recipe; receives pass, fail and no-read; runs the reject or stops the line.
Labeller	Sends the data it has just printed, so printed and read content can be compared.
MES	Holds batch, order and expected count; stores the result per case.
WMS	Holds the expected pallet ID; releases the pallet for dispatch only after a match.

On a mismatch or no-read, the case is diverted or the line stopped, or the pallet is held, and the image and reason are logged. Protocol support depends on the reader or controller model: HIKROBOT's catalogue lists protocols such as PROFINET, EtherNet/IP and Modbus on specific code reader models (vendor-stated). See **PLC and reject integration**. A line that matches barcode and card reads against a batch data file, and rejects on a mismatch, is described in the **envelope verification case**.

// ACCEPTANCE

How the station is accepted

False rejects and missed faults pull against each other. We define both, and how they are measured, before FAT and SAT.

01

False reject rate

The share of correct cases or pallets rejected, measured on agreed good

02

Missed fault rate

The share of short cases, wrong labels and reversed cases that pass, measured

03

Data link failure

A test of what happens when the PLC, MES or WMS link drops: the station must

samples at line speed.

with seeded faults.

hold product, not pass it.

// BEFORE WE START

What to prepare for the sample test

We check your own cases and labels before proposing a station. We confirm quantities and shipping with you first.

Sample preparation guide

Good samples
Packed cases and printed case and pallet labels from normal production.

Faulty samples
Short cases, wrong or damaged labels, labels on the wrong face, clearly marked.

Label specification
Label templates, barcode types and where each label goes on the case and pallet.

Data information
PLC, labeller, MES and WMS names, and example records of expected data.

// FAQ

Carton and pallet verification questions

What is an SSCC?

The Serial Shipping Container Code is the GS1 number that identifies one logistic unit, such as a pallet or a shipping case, from dispatch to receipt. GS1 makes it the single mandatory element on every GS1 logistic label, carried in a GS1-128 barcode.

What is the minimum barcode grade for carton and pallet labels?

The GS1 General Specifications set the minimum symbol quality for barcodes in general distribution, such as ITF-14 and GS1-128 on cases and pallets, at 1.5/10/660, where 1.5 corresponds to ISO grade C. Checking a label against that grade needs a verifier; an in-line reader confirms that the code decodes with the right content.

Can a camera count the units inside a sealed case?

No. A camera cannot see through board or opaque film. Count while the case is open, or weigh the sealed case. Its label and orientation can still be checked.

How are pallet labels checked against the WMS?

A reader decodes the pallet ID, usually an SSCC, at a defined stop. The station or WMS compares it with the pallet expected there, and the pallet is released only on a match.

What happens when a label does not match or cannot be read?

A no-read is a fail, not a pass. The case is diverted or the pallet held, the image is logged, and an operator corrects it before it re-enters the flow.

Can the station check that both labels on a pallet carry the same ID?

Yes, if both labels are imaged, by two readers or at two stops. The reads are compared with each other and with the expected ID.

Does reading the label prove it meets GS1 or retailer print-quality rules?

No. Reading shows the barcode decodes with the right content. A print-quality grade needs a dedicated verifier, which we do not supply.

Where must the pallet labels be placed?

Where your customers require them; the GS1 Logistic Label Guideline gives placement recommendations. For the camera, what matters is that every pallet carries its labels on the same faces and zones.

RELATED: Choosing a HIKROBOT code reader → Barcode verification and grading → Presence & counting → Label & print inspection → OCR/OCV & code inspection → Food & beverage lines → PLC & reject integration → Inspection technology →

LINE SOLUTIONS USING THIS: Multipacks → Meat tray labels → Fruit export cartons → Tyre codes → DC scan tunnel → Pallet labels at dispatch →

COMMON IN THESE INDUSTRIES: Food & beverage → Agro-processing → Metal components → Logistics & distribution →

TYPICALLY BUILT WITH: Fixed code reader (HIKROBOT ID series) → Vision sensor (HIKROBOT SC1000–SC3000) → 3D laser profiling →

SOURCES

1. GS1: Serial Shipping Container Code (SSCC) (https://www.gs1.org/standards/id-keys/sscc) `(standards body page, checked 2026-09-24)`
2. GS1 Logistic Label Guideline (https://www.gs1.org/standards/gs1-logistic-label-guideline) `(standards body page, checked 2026-09-24; label placement and verification sections)`
3. HIKROBOT Machine Vision Smart Product Catalog, 2025 Q4 (PDF) (https://www.hikrobotics.com/en2/source/vision/video/2026/1/20/Machine%20Vision%20Smart%20Product%20Catalog_2025Q4.pdf) `(vendor catalogue, checked 2026-09-24; code reader protocol rows)`

`// CARTON & PALLET VERIFICATION`

Request an assessment for this application

Tell us how cases and pallets are labelled and where the expected data is held, and send good and faulty samples. We will tell you what a station can check.

Start application assessment