

AMR / AGV · VDA 5050

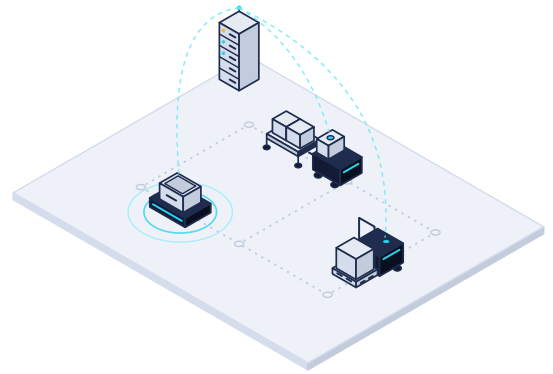
VDA 5050: choose the right robot, then check its claim before you mix fleets

An independent guide for operations managers, engineering, IT/OT, procurement and executives. Start by choosing the right AMR or AGV for each job, then test a "VDA 5050 compatible" claim, ask for evidence, prove it in a pilot, and plan one fleet control only where every robot supports it.

What VDA 5050 is, and what it is not

An open interface, not a promise of plug and play

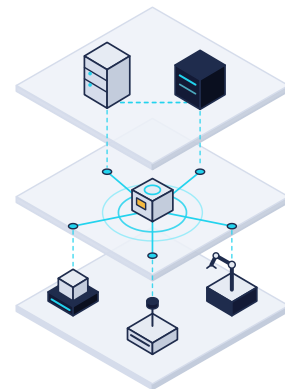
- **What it is:** an open interface for orders and status between one fleet control (called master control before version 3.0), often called a fleet manager, and mobile robots, published by VDA and VDMA, the German automotive and machinery bodies. Messages are JSON text sent over MQTT messaging.
- **What it covers:** orders as nodes and edges, actions such as pick and drop, robot state, errors, position and a factsheet of what the robot can do.
- **What it does not cover:** vehicle safety, the fleet control software itself, your WMS or MES link, or how traffic is optimised. Those need their own specification.



Why a claim needs checking

Two robots can each claim VDA 5050 and still not work well under one fleet control

- **Versions differ:** robots and fleet controls may support different versions. Version 3.0, released in March 2026, renames many fields and is not backwards compatible with 2.x.
- **Not everything is mandatory:** core topics are required, but many fields, actions and some topics are optional. A claim may cover only the parts the manufacturer chose.
- **Extensions creep in:** manufacturers add their own actions and parameters, and some features still need the manufacturer's own fleet software.
- **No certificate to rely on:** we know of no official certification scheme. A datasheet line is a claim, not evidence.



WHO SHOULD READ WHAT

Operations managers

Pages 4 and 5: fleet options, traffic, safety and KPIs.

Engineering

Pages 2 and 3: versions, topics and evidence.

IT/OT

Pages 3 and 4: broker, network, security and the business system link.

Procurement

Pages 3 and 5: questions to ask and contract points.

Executives

This page and page 5: what to require and how to judge payback.

Choosing AMRs or AGVs? Talk through your use case and fleet plan on a [free 30-minute call](#).

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Version and messages

Ask which version, then which parts of it

Version	What to know when buying
1.x	Early versions. Treat as legacy: ask about an upgrade path before buying a robot that only supports 1.x.
2.0	Widely implemented. Added the factsheet topic, so a robot can describe its own capabilities to the fleet control.
2.1	Added corridors (room to move around obstacles within limits), map distribution to robots and error hints. Ask whether these are supported or only the 2.0 core.
3.0	Released March 2026. Adds support for freely navigating robots through planned path sharing and zones, new operating modes and action states, and makes pause, resume and cancel order mandatory. Field names change, so 2.x and 3.0 integrations need work to talk to each other.

Topic	What it carries
order	Fleet control to robot: the route as nodes and edges, with actions.
instantActions	Actions that run at once, such as pause, resume, cancel or request a factsheet.
state	Robot to fleet control: position, progress, loads, battery or power, errors, actions.
visualization	Optional. Position and path at a higher rate, mainly for display. In 3.0, traffic control may also use it.
connection	Whether the robot's link to the broker is online, offline or broken. Not the same as ready to work: that is in state.
factsheet	What the robot can do: size, speeds, load, supported actions and limits.

Version 3.0 also adds two optional topics from fleet control to robot: zoneSet and responses.

CLAIM CHECKLIST

CHECKLIST

Five points to get in writing

- ☐ **Exact version and patch level** the robot runs today, and on which firmware.
- ☐ **Supported topics**, including whether factsheet and visualization are sent.
- ☐ **Manufacturer extensions**: every non-standard action or field, and what breaks without it.
- ☐ **Roadmap**: when, and at what cost, the robot moves to a newer version.
- ☐ **Which fleet control software** the manufacturer has tested with, beyond its own.

We check the rest against the factsheet and message logs.

Get the factsheet first. Ask for the factsheet the robot actually sends, from the firmware you would receive, not a brochure table. It is the quickest way to see what the robot says it supports. Then verify it with logs and tests.

CLAIM REVIEW

What we check when we review a VDA 5050 claim for you

- **The factsheet** against the claim on the datasheet.
- **The message logs** for behaviour, not only format.
- **Each extension**, and what it ties you to.
- **The upgrade path**, and what version 3.0 means for your fleet.

Scoped per project. The fees are on page 6.

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Ask for evidence, then test it

A datasheet line is a claim. Evidence is what the robot actually does

EVIDENCE

Conformance evidence to ask for

- ☐ **Factsheet file** from the shipped firmware.
- ☐ **Message logs** of order, state and action runs. A schema check proves the format, not the behaviour.
- ☐ **A recorded test with a fleet control that is not the manufacturer's own**, with the version of each piece of software.

QUESTIONS

Questions to ask the robot manufacturer

- ☐ Can the robot run **without your own fleet software** in the loop? If not, what does that software do?
- ☐ How does the robot behave when an **order update arrives late** or the network drops?
- ☐ Who **fixes an interface fault**: you, the fleet control provider or the integrator?

We tell you which evidence matters for your fleet.

PILOT

The cases a pilot must prove

- **Obstacle in the path**
- **Emergency stop and manual mode**
- **Network loss and roaming**
- **Restart mid-order**
- **Two manufacturers at one crossing**
- **Error injection**

We write and run the test script on your site, with your network and your fleet control.

SECOND OPINION

What we go through on the call

- **Your robots**: which jobs they do, and which version each one runs.
- **The claim**: what the factsheet and logs show, and what is still missing.
- **Fleet control**: one fleet control, separate fleets or a phased path.
- **Risk**: what to prove in the pilot before you buy the next robot.

Bring the datasheets or factsheets to a free 30-minute call.

Plain-language glossary

Fleet terms

- **AGV**: automated guided vehicle, usually follows defined routes.
- **AMR**: autonomous mobile robot, usually plans its own path. Check what each vehicle can actually do.
- **Fleet control (master control in 2.x)**: the software that gives orders to the robots and manages traffic.

Interface terms

- **MQTT broker**: the message hub robots and fleet control connect to.
- **Factsheet**: the robot's own description of what it can do.
- **Nodes and edges**: the points and paths that make up a route.
- **Base and horizon**: the part of the route a robot may drive now, and the planned part it may not drive yet.

Project terms

- **Conformance evidence**: logs and tests used to check a robot's VDA 5050 claim.
- **Acceptance test**: the test the system must pass before you pay or go live.
- **IT/OT**: office IT and operational technology on the shop floor.

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Fleet control options

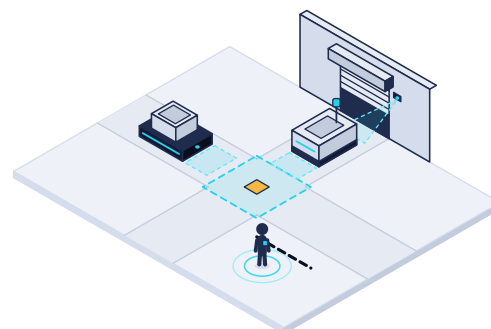
Choose who directs the fleet before you choose the next robot

Option	How it works	Strengths	Watch for
One manufacturer's fleet software as fleet control	The fleet software of your main robot manufacturer also directs other manufacturers' robots over VDA 5050.	One provider for most of the fleet; often the quickest start.	How well it handles other manufacturers' robots in practice, and lock-in if that manufacturer is later replaced.
Independent fleet control	Fleet software from a technology provider that does not sell the robots directs all of them over VDA 5050.	Can reduce reliance on one robot manufacturer; one traffic and order logic for the whole site.	Depth of support for each robot type, lock-in to the fleet control itself, and who is accountable when a robot and the fleet control disagree.
Separate fleets with a layer above	Each manufacturer keeps its own fleet software; a layer above shares orders, zones, doors and lifts.	Each robot runs on the software its manufacturer knows best.	Shared areas are hard to coordinate, and the layer above becomes custom software you must own.
Phased hybrid	Start with separate fleets in separate areas, then move shared areas under one fleet control.	Lower risk while you prove each robot type.	A clear end state and date, so the temporary set-up does not become permanent.

Maps, traffic and IT/OT

The work that decides whether a mixed fleet runs well

- **One site layout reference:** agree one coordinate system and layout the fleet control and every robot map line up to. Keep versions and an owner for every change.
- **Traffic rules in writing:** including where robots meet forklifts and people.
- **IT/OT design:** broker, network, security and wireless roaming agreed with IT and OT before the pilot.
- **Business systems above:** the WMS or MES link to the fleet control is not part of VDA 5050. Specify it separately.



What it means for each role

YOUR ROLE	WHAT IT MEANS FOR YOU
Operations	The right robot for each job, and a tested view of which robots can share one fleet control.
Engineering	A written test script and evidence instead of a datasheet line.
IT/OT	Broker, network and security agreed under your change control. VDA 5050 itself does not set security measures. If robots, cameras or tags record staff, check local privacy and employee-consultation rules, such as works councils or unions.
Procurement	The VDA 5050 scope, acceptance test and upgrade path written into the contract.
Executives	The right AMR or AGV for each job, with any shared fleet control proved in a pilot first.

Choosing AMRs or AGVs? Talk through your use case and fleet plan on a [free 30-minute call](#).
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Book a free 30-minute call

Safety review and contract points

Agree responsibilities before the pilot, and terms before you sign

CHECKLIST

Safety review

- ☐ **VDA 5050 is not a safety interface.** Personnel protection stays on each vehicle and in your site design.
- ☐ **Each vehicle** comes with its manufacturer's conformity documents for your market and the safety standards it follows, for example ISO 3691-4 for driverless industrial trucks.
- ☐ **System risk assessment:** covers robot to robot, robot to forklift and robot to person interactions, doors, lifts and shared aisles.
- ☐ **Responsibility agreed:** who is responsible for the overall system risk assessment and conformity under your local machinery rules.

We review safety responsibilities with you before the pilot.

CONTRACT

Before you sign

- ☐ The robot's **VDA 5050 version, topics and actions** are written into the contract.
- ☐ An **acceptance test** with your fleet control is a condition of payment.
- ☐ **Maps, logs and configuration** are your data and can be exported.

We review the contract terms with you before you sign.

KPIS TO TRACK

A KPI is a number you track, before and during the pilot.

- **Orders completed on time** against plan
- **Time from order release to start** of driving
- **Robot availability** by manufacturer and type
- **Manual interventions** per shift, by cause
- **Waiting time** at crossings, doors and lifts
- **Interface errors** by type and manufacturer
- **Effort to add a new robot type** to the fleet

We agree how each KPI is measured, and the baseline, in the pilot plan.

TOTAL COST AND PAYBACK

ROI (return on investment) compares what you gain with what you spend. Payback is the time until the savings cover the cost.

What drives payback here

- Manual transport hours saved, less supervision and intervention time
- Delays avoided at crossings, doors and lifts
- Integration work avoided for each new robot type

If the benefit is not bigger than the running cost, there is no payback.

Bring to the call

- Your robots today and planned, by manufacturer
- Transport hours and delays today, from your records
- Your fleet control plans, if any

We work out total cost and payback with you from your own pilot data, not technology provider averages. **Bring rough figures to a free 30-minute call.**

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How a TRACIO project works: five stages

1 Discovery

Your pain points, site, process and KPIs.

2 Assess and shortlist

Site survey, then the options that fit compared.

3 Pilot with KPI baseline

KPIs measured first. Pass marks agreed in writing before set-up.

4 Integrate

If useful, one agreed link into your WMS or MES, under your change control.

5 Multi-site roll-out

Only after a go decision, one area at a time.

How a pilot runs: set-up, then live weeks in normal use, then a short written report with a go or no-go. Timings are agreed per site.

Questions we hear

"We already have a system."

We give a free second opinion and check how it performs against your KPIs, using your live data and a site visit.

"How do we know it will work here?"

Judge us on method: a pilot, KPIs measured before and during it, and a written go or no-go.

"Can you bid with us, or for us?"

Yes. We team with integrators, or act as the buyer's independent adviser, but never both on the same bid.

"Do you sell or resell hardware?"

No. We don't sell hardware, so our advice stays independent. We rent pilot equipment and offer survey and installation support.

Free second opinion

Send us your technology provider's quote or spec for a free second opinion. What to send: the quote or spec, a floor plan or site photos, item counts and your current process. Bring it to the call or send it via tracio.com/contact.

TRACIO consultancy fees

- **UK:** £3k to £30k per project, £1,200 a day
- **Europe:** €3.5k to €35k per project, €1,400 a day
- **US and Canada:** \$4k to \$40k per project, \$1,600 a day
- **Middle East and Australia:** \$4k to \$40k per project, \$1,600 a day
- **Rest of the world:** \$3.5k to \$35k per project, \$1,400 a day

Scoped per project, no packages. Fees cover our work only; hardware, software licences and other supplier costs are separate. \$ = US dollars. Travel extra.

Why TRACIO: we work for you, not for the technology providers. We compare the options across the market that fit your site, provide site surveys and installation support, and work worldwide under your change control.

SECOND OPINION

What to send us before the call

- **Datasheets or factsheets** for the robots you have or plan to buy.
- **A site layout** with the main routes, doors and lifts.
- **Your fleet control plans**, if any.
- **Your target dates** for the pilot and roll-out.

Also from TRACIO: buyer guides on judging an RFID or RTLS proposal, automatic bookings into MES and WMS and tool control and RTLS for aviation MRO; checklists for RF site surveys, UWB anchor placement, RTLS pilots and RFID feasibility studies. Ask for any of them on the call or at tracio.com/contact.

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